

An Introduction and Evaluation of a Preventive Music Therapy Intervention in the Context of Poverty: A Conceptual Framework

By

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Abstract

Poverty is a serious health problem accompanied by many consequential risk factors, that exist within Bronfenbrenner's ecological systems theory. These environmental and parental risk factors lead to complex trauma and toxic stress. When traumatic events occur early in life, there is a detrimental impact on the development of attachment, self-regulation, language development, and social skills. Preventive interventions can help support these impacted developmental areas. One preventive intervention, Therapist and Music Attuned Co-regulation (TMAC), was developed at an inner-city child development center (ICCDC). This research establishes the theoretical foundation of this intervention within the context of the needs of children and families living in poverty. In addition, a conceptual framework will be discussed and compared to these theoretical foundations. This research includes an evaluation of this intervention and whether it addresses the identified needs of the population, followed by future recommendations to further address the effectiveness of the intervention.

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Chapter 1: Introduction

As a society, we often place our own judgments on poverty and the people living it daily. The truth is, this potentially negative view is likely misinformed and unacceptable. We will never fully understand what the mother of five living on an income of less than \$20,000 would experience every day without living her life. Poverty consists of more than choosing food over electronics or not being able to pay a water bill for one month; it is living every day with substantial dire, painful choices. Does a parent let the five-year old stay at home to watch the younger sibling because the car has broken down that morning, or does the parent take the time to ride the bus and drop the children at daycare but then be late to work? Meanwhile, if the parent is late to work again, that parent risks being fired, as this scenario happens all too frequently. Does the parent choose to pay the water bill or take the child to the doctor even without health insurance as it is unaffordable on a low income? Poverty is not a matter of making the wrong choice. It is realizing that in the same situation, dealt the same hand of cards, we would all make the same decision in an effort to try to do what is best.

Overall, we can acknowledge these situations and affected populations with cultural humility. While we can read and write about the research of risks, effects, and statistics about poverty, we are not living these experiences and challenges of poverty. Cultural humility is a lifelong choice to learn, self-reflect, and self-critique, especially when working with diverse populations. It is a way of life and potential change in perspective, recognizing diversity and power imbalances (Foronda, Baptiste, Reinholdt, & Ousman, 2015). This way of life requires that we be humble and flexible enough to let go of stereotypes and the security they can bring. We can be willing to admit “I don’t know” when we truly do not. Furthermore, we can place importance on acquiring more knowledge about others’ cultures when working with or getting to

know people, and also demonstrate a shift or change in our behaviors and attitudes (Foronda et al., 2015; Tervalon & Murray-García, 1998). An individual must be open, self-aware, and supportive. This openness and vulnerability creates the opportunities for partnerships, respect, mutual empowerment, lifelong learning, and optimal care (Foronda et al., 2015).

Therefore, of utmost importance is that we do our best to understand and to learn from the individuals who experience poverty. Each person is a complex human being and an individual, unique in his or her own way. We need to be empathetic to others' experiences and care about one another. We need to find our commonalities and differences and pair them together to form a transformative action plan to combat the many obstacles families in poverty encounter.¹

Poverty is the most consequential health problem our communities are facing (Gardner, 2017, March 29). There are so many influences and factors that are a part of living in poverty. For example, a lack of resources (i.e. money) makes it difficult to meet basic needs, such as food, gas, rent, and healthcare, presenting very significant areas of need. In Maslow's hierarchy, people living in poverty are living in the lowest, most basic level of needs, and sometimes even these are not being met. This hierarchy, based on motivational theory, suggests five tiers of needs ranging from physiological to self-actualization. Basic needs represent a significant area of need at the lowest level of the hierarchy. Therefore, people living in poverty face great challenges

¹ The researcher would like to emphasize that as she writes what is known and what she has seen, she has not experienced poverty herself and cannot fully comprehend the lives and experiences of poverty and those living in it. With this research, she is trying to further the change that is possible through understanding and the use of cultural humility, approaching the topic of poverty from a particular lens.

moving on to the higher levels of need, as their most basic physiological needs are unmet (McLeod, 2016).

Besides the influence poverty has on the ability to meet basic needs, poverty may also create significant stress and health issues. Brains develop through the experiences people have every day. Infants and young children in poverty are facing experiences and fighting circumstances that negatively influence their present and future mental health; this impact can only be more detrimental during the time of key development (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). When poverty creates chronic stress due to potential risk factors such as violence or maltreatment, the brain is on high alert, or in constant fight or flight mode. This release of chemicals and the high levels of hormones can change structures in the brain and be harmful to the child's health (Center for Youth Wellness, 2017). What was once lifesaving in times of danger, the fight or flight mode may now become life harming through the presence of every day, high-level, stress (Center for Youth Wellness, 2017; Gardner, 2017, March 29).

The U.S. spends more money on healthcare than any other developed country, and yet, it ranks low on most measures of health and has the lowest overall ranking in healthcare out of eleven developed countries (Blank, 2012; Schroeder, 2007; The Commonwealth Fund, 2017). This poor demonstration includes very low or lowest rankings in equity, access, and efficiency of healthcare. Most importantly, the United States does not provide universal health insurance coverage. This factor alone greatly influences access and equity of healthcare in the country, as many families living in poverty or with low incomes often do not have access to health insurance coverage. Families with low-incomes frequently choose not to go to the doctor when sick, do not go to follow-up appointments and treatments, skip prescription dosages, or go without care due

to a lack of funds (The Commonwealth Fund, 2017). The issue of access to healthcare becomes even more consequential when the topic of mental health is brought to our attention.

While it may seem more expensive to take a preventive approach to healthcare, it is costly to treat the effect and impact of untreated mental illness. Massive amounts of money are spent indirectly every year on people with untreated mental illness including costs to be in criminal justice systems, necessity for remedial services, support for disability services, disruptions in work and family, as well as the more anticipated healthcare costs resulting from an untreated mental illness rather than on potential preventive costs (Hogan, 2002; Insel, 2008; National Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009). These factors and associated expenses create a large economic burden (Insel, 2008) and the United States would likely benefit from preventive measures, potentially eliminating some of the aforementioned spending by reducing the risk associated with these costs. Preventive care must start with a shift in the current healthcare system. Currently, mental health issues are most commonly treated once they occur, rather than taking initiative beforehand to potentially prevent the disease from occurring for at risk individuals. Prevention looks more at long-term health and thinks about what would be best for the person in this situation to help them 5 or 10 years in the future (National Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009).

The issue of prevention is not just a matter of fixing one aspect of an individual's life, but instead taking preventive measures on a national scale. Policy makers, scientists, families, and

practitioners need to join together, collaborate, become educated on the issues, and start to take action to prevent potential health risks through effective preventive interventions. Healthcare professionals can push for prevention policies, find and evaluate culturally-relevant preventive strategies and interventions, and help make these interventions available to any family or individual who may benefit (National Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009). Interventions need to look at many levels of the system to help address the full needs of the child. At the family level, parents need to learn about toxic stress and the consequences for the child related to learning and health. On the community level, investing in local programs for after-school and early-intervention programs is necessary. Investment should be in both family therapies and child mental health services. Finally, at a national and organizational level, partnerships between health and legal departments are needed to address and put in place policies on social conditions (American Academy of Pediatrics, 2012).

With so many systemic factors, we may be challenged to better understand what our role as therapists and researchers should be in order to prevent the risks of poverty and reduce potential detrimental outcomes. One way to help is to empower those individuals impacted by poverty (Gardner, 2017, March 29). We can join together as health professionals and families experiencing poverty to advocate for better opportunities and resources for children and families living in poverty. We can have conversations with parents living in poverty to both help us learn about their lives and to educate parents on the science of risks and poverty for families and children. Through conversations, we can empower parents to make lifestyle changes as needed while advocating for their needs in the community and encouraging reform of healthcare

policies. Most often, parents want what is best for their child, and it is important to form bonds with and promote empowerment for parents (Gardner, 2017, March 29).

We can also promote the use of preventive interventions with these at-risk populations. Currently, early intervention starts during the preschool age; yet, babies and toddlers are experiencing developmental risks associated with poverty each and every day, while simultaneously trying to develop at rapid rates. Intervention needs to occur before these developmental risks, and their effects increase. Programs need to focus on early childhood as well as early adolescence-an additional time of significant growth and development-to try to prevent the next generation of cyclical poverty. This prevention includes identifying children with specific high-risk factors for even more targeted interventions. Finally, we need to invest and advocate for programs and services that are focused on health and prevention (Gardner, 2017, March 29).

Music therapy is one such service that can use targeted interventions in a preventive manner in early childhood and early adolescence, as well as within families and communities. One example is Sing and Grow in Australia, which is a music therapy program partially funded by the Australian government. The program focuses on encouraging familial relationships and development through music, and provides a safe, shared play environment between parent and child (Sing & Grow, n.d.). Similarly, music therapy programs like this in the United States could address some of the early preventive mental health and developmental services needed for children and families living in poverty from birth, especially in combination with basic needs and necessary healthcare services being met. The goal of such programs would be to move the trajectory of human lives towards a more positive and resilient outcome. Even a little shift is how we will begin to make a difference.

Currently, there is such an early, preventive music therapy intervention at an inner-city child development center (ICCDC) that serves children in poverty, the Therapist and Music Attuned Co-regulation (TMAC) intervention (B. Corey, personal communication, January 2016-March 2017; E. Merz, personal communication, January 2017). This intervention was developed to address the needs of young children identified in a clinical context. While other music therapy interventions may exist, few have been systematically studied to thoroughly understand the intervention in the context of a myriad of risk and protective factors and moderators. Therefore, the purpose of this study was to develop a deeper understanding of the Therapist and Music Attuned Co-regulation (TMAC) intervention effectiveness and potential impact on development in early childhood in the context of poverty in order to refine the intervention and influence program development at the ICCDC. To address this purpose, the following four steps were taken. First, the influence of poverty on development and existing interventions was established to describe theoretical frameworks for intervention. Second, the current music therapy intervention at this facility was described. Third, the current TMAC intervention was compared to the proposed theoretical frameworks and then examined and discussed. Finally, congruence and incongruence between the intervention and the proposed theoretical frameworks was discussed as well as the limitations of the intervention in its current state and challenges for implementation. Recommendations for intervention revision and modifications for measurement of outcomes were made, in addition to suggestions for future use, development, and research of the TMAC intervention.

Chapter 2: Review of Literature

Poverty is of global concern, experienced by hundreds of millions of people across world. Globally, the poverty level is defined as living on less than the American dollar equivalent of \$1.90 per day. The most recent reports from 2013 state there are 767 million people living in extreme poverty, which is 10.7% of the population. Over half of these 767 million people include children under the age of 18. While these statistics are down from 35% or 1.85 billion people in 1990, there are still far too many people experiencing poverty each day. A large portion of this decrease occurred between 2012 and 2013 primarily concentrated in South and East Asia and the East Pacific, which means the decrease is disproportionate across the world. There are many other areas of the world that continue to have high levels of poverty, including Sub-Saharan Africa (The World Bank Group, 2016). While there may be more extreme levels of poverty in underdeveloped countries, poverty and low-incomes in developed countries like the United States continue to exist and affect people daily.

According to the U.S Census Bureau, there were 40.6 million people or 12.7% of the population living in poverty in the United States in 2016 (Semega, Fontenot, & Kollar, 2017). This includes both adults and children, but children under 18 are far more likely to experience low-income or poverty. In this case living in poverty is living on an income at or below the poverty threshold (U.S. Census Bureau, 2017), while low-income includes children and families that live on incomes that are less than twice the federal poverty threshold (National Center for Children in Poverty [NCCP], 2017). In 2015, the National Center for Children in Poverty reported that 30.6 million or 43% of children under the age of 18 in the United States live in low-income families. Twenty-one percent, or 14.8 million of those children live in poverty (Jiang, Granja, & Koball, 2017a). More specifically, young children comprise a significant portion of

those living in poverty. Of the previously mentioned 30.6 million children in low-income families, 10.5 million are under the age of six. Of the 14.8 million children living in poverty, 5.3 million are also under the age of six (Jiang, Granja, & Koball, 2017b). These numbers are not only high, but have been increasing since the 2007-2009 recession. Between 2008 and 2014, the percentage of children living in low-income families and families in poverty increased 10% and 18% respectively (Jiang, Ekono, & Skinner, 2016). More recently, the number of people living in poverty and the poverty rate decreased by 2.5 million people, or 0.8 percentage points between 2015 and 2016 (Semega et al., 2017). However, a great need remains to decrease these numbers even more and support those living with low incomes.

Poverty is relevant at regional and state levels as well. Within one Midwestern state, the approximate percentage of people living in poverty is 14.8%, or about 875,495 people (Bishaw & Glassman, 2016).² In 2015, most counties in the region and state had a poverty rate under 20%, including the major metropolitan area, which is comparable to the overall rate of poverty in the nation. The county that encompasses this major metropolitan area and the ICCDC had a poverty rate of 14.7 to 19.5% for the total population in 2015. This rate increased between 0.1 and 3.0 percentage points from 2014 and 2015 in addition to an increase in poverty rate of 0.1 to 3.0 percentage points between 2007 and 2015 (U.S. Census Bureau, 2016a), despite efforts to decrease poverty. The rate was even higher for those under the age of 18 years old, in which the poverty rate was 20.7 to 26.3% in 2015 (U.S. Census Bureau, 2016b). With poverty rates this

² Due to the sensitivity of this subject and the confidentiality of the data and site, the researcher will not report poverty data about the specific state and city as it may identify the facility.

high within the county and city, there is a clear issue to be addressed, especially when basic needs are not being met for a population.

The amount of money needed to support a family and meet its basic needs is often underestimated. Most recently, in 2015, the federal poverty threshold for a family of four, including two children, was \$24,036. For a family of three including two children, the federal poverty threshold level was \$19,096 (Proctor, Semega, & Kollar, 2016). For families living in deep poverty, the annual income for a family of three is as low as \$9,276. This means that a family of three lives on about \$27 a day, or less than \$9 per family member for all their basic needs (Jiang, Ekono, & Smith, 2016). To meet basic needs in the United States, families need about twice the poverty threshold (Cauthen & Fass, 2007), which in a family of four with two children would be \$48,072 (Proctor, Semega, & Kollar, 2016). Low-incomes and poverty often create situations of food insecurities for children. Among households in poverty, 28.9% report food insecurity for children (Wight & Thampi, 2010). The life of poverty is very challenging, placing stress and risks on healthy development and relationships for both parents and children.

Risk Factors

Low socioeconomic status or living in poverty is labeled as a risk factor in developmental psychology. A risk factor is one that has been identified as negatively influencing children's development and the following trajectory. Factors that hinder the healthy development and functioning of the parent-child relationship produce suboptimal and sometimes detrimental outcomes for the child. These risk factors include but are not limited to parental mental health, low socioeconomic status, young parental age, harsh discipline, inconsistent discipline, maltreatment, neglect, early deprivation, divorce, violence exposure in neighborhoods, quality of day care, and cultural differences. Exposure to risk factors changes how the child learns about

the world and one's individual self (Navsaria, Gilbert, Lenze, & Whalen, 2017). Each risk factor influences the child in various ways and in different intensities, depending on the severity of the risk factor. More specifically, parental and environmental risk factors are important to recognize due to the great effect they have on child development.

Parental Risk Factors

Relevant risk factors related to the parent include parenting practices and characteristics of the parent. Parenting practices can be broken down further into inconsistent parenting and harsh parenting. Patterns in parenting style based on socioeconomic status, suggest that parents in lower socioeconomic classes are harsher or more authoritarian and punitive with potential physical punishment, rather than allowing children to develop initiative and be more equal participants in the home (Hoff, Laursen, & Tardif, 2002). Associations have also been found between living in poverty and harsh parenting practices of child neglect or abuse (Bywaters et al., 2016; Pelton, 1978). Thus, familial relationships present further stressors that not only influence development, but also create risks in attachment relationships. For example, harsh parenting has been linked to externalizing behaviors (i.e. aggression, hyperactivity, and those behaviors directed outward) for young children (Bayer, Hiscock, Ukoumunne, Price, & Wake, 2008; Navsaria et al., 2017); harsh parenting also has lasting effects on the child throughout development, including relationships in adulthood (Navsaria et al., 2017). Inconsistency in parenting also puts the child at-risk, as it is associated with the symptoms of mental illness (Dwairy, 2008). Parenting practices on a more extreme level are accompanied by more extreme risks for the child.

Maltreatment and neglect related to institutional care or parental practices are extremely harmful to development. Maltreatment in early life indicates symptoms of externalizing and

internalizing behavior problems, including those related to post-traumatic stress, anxiety, and depression. If maltreatment occurs before an infant is one year old, it is predictive of both adaptive functioning and externalizing behaviors (English et al., 2005), and has a significant negative impact on regulation and self-control later in childhood (Cowell, Cicchetti, Rogosch, & Toth, 2015). Maltreatment has also been related to negative patterns in executive function (Cowell et al., 2015), peer relationships and self-esteem (Bolger, Patterson, & Kupersmidt, 1998), and emotion regulation (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000; Zeanah, Fox, & Nelson, 2013). Children experiencing early deprivation through institutionalization have higher symptoms of ADHD, externalizing disorders, and internalizing disorders than children that never live in institutions. Early deprivation also results in an increased risk for externalizing and internalizing disorders during adolescence (Humphreys, Gleason, et al., 2015). Early neglect or deprivation also has a negative lasting influence on cognitive functioning (Navsaria et al., 2017).

The characteristics of the parent also influence the child's development. Some characteristics are considered risk factors, such as parental age and mental health. Young parental age potentially increases the chance of exposure to many other risk factors, including low socioeconomic status, less sensitive parenting, abuse and neglect, and single-mother households, which each add their own risks to the child (Navsaria et al., 2017). Additionally, preschool children living with parents with bipolar disorder are at elevated risk to develop attention deficit hyperactivity disorder (ADHD) and have higher rates of developing two or more psychiatric disorders (Birmaher et al., 2010). Children with mothers that have psychiatric disorders, such as an eating disorder, are at risk in early childhood to develop a difficult temperament and psychopathology that includes peer difficulties, hyperactivity, and emotional

and conduct disorders (Barona, Nybo Andersen, & Micali, 2016; Micali, Stahl, Treasure, & Simonoff, 2014). Exposure to traumatic events is also associated with high parenting stress and parents experiencing clinical anxiety and mood symptoms (Briggs-Gowan, Ford, Fraleigh, McCarthy, & Carter, 2010). Some parental mental illnesses carry more risks than others, but there is overall increased risk with any mental illness.

In particular, some mental illnesses influence the child in multiple ways. One highly relevant illness, due to its many risks, is alcoholism. When alcoholism is present in the household, children are also more likely to have adverse childhood experiences. As these adverse childhood experiences increase, the risk of developing alcoholism and depression in the child increases, regardless of the parent's health. Furthermore, when children of parents struggling with alcoholism become adults, they are 30-50% more likely to have a depressive disorder. In fact, the risk of suicide, mental illness, and drug abuse appears strongest when the mother has alcoholism (Anda et al., 2002). In contrast, better mental health in mothers is actually predictive of better resilience in children (Howell, Graham-Bermann, Czyz, & Lilly, 2010). Parental mental health is a key factor in the child's mental and physical health, whether it is a negative or positive influence.

Family characteristics can increase the child's risk as well, particularly for families that are large, single-parent households (George, Cummings, & Davies, 2010). Exposure to traumatic events is associated with single-parent households (Briggs-Gowan et al., 2010). A single-parent household caused by divorce or other factors in early childhood influences young adulthood, increasing the risk for the child to become a heavy smoker, have lower education attainment, experience higher levels of distress in young adulthood, and have higher risks of early pregnancy and inactivity (Ermisch & Francesconi, 2001). The absence of the father is a risk factor because

the father is a key figure in attachment during preschool (George et al., 2010). In addition, an increase in family size is linked to an increase in food insecurity, another risk factor for children (Wight & Thampi, 2010).

Divorce is another family factor that actually varies from risk to protective, with some children developing problems and others improving their health and well-being. High levels of marital discord have many implications, including increased risk for externalizing disorders such as conduct disorder, oppositional defiant disorder, or attention-deficit/hyperactivity disorder; internalizing disorders such as depression and anxiety disorders (Emery, 1982); and academic, behavioral, and social problems (Kitzmann, Gaylord, Holt, & Kenny, 2003). When intense marital discord or interparental violence occurs during preschool, these effects are even more pronounced (Kitzmann et al., 2003). Most of the time, divorce increases the risk of academic, emotional, behavioral, and interpersonal problems in children (Amato, 2010). The larger the change or transition, the greater the implications and psychological adjustment, and consequently more assistance may be needed (Beckett & Taylor, 2010). However, in some situations, divorce removes a child from the risk of a high-conflict environment, improving the child's well-being (Navsaria et al., 2017). Family characteristics play a large role in the child's life, but more research is needed to make these risks clearer.

Environmental Risk Factors

The environment and community carry many risk factors for those living in poverty. Housing is typically more crowded, of a lower quality, and located in more dangerous neighborhoods, creating an environmental stress (Evans, 2004) possibly associated with negative emotional and behavioral outcomes (Leventhal & Brooks-Gunn, 2000). People are more likely to experience violence or traumatic events in low-income neighborhoods, contributing to a potential

increase in behavioral or emotional problems. Moreover, dangerous neighborhoods reduce the ability to safely play outside, creating potential risks for mental and physical health (Navsaria et al., 2017).

Exposure to violence is one example of a risk factor that is a traumatic event, putting children at risk mentally and physically. The risk of exposure increases with access to guns and limited supervision from parents (Slovak, 2002). One study showed that in domestic violence events, children were present 50% of the time, and were directly exposed to the violence in 80% of these incidents. In addition, when children were exposed to violence, the households were most likely to be single female household, low-income, and non-white (Fantuzzo & Fusco, 2007). The severity of the violence also makes a difference. The more violent the incident as reported by the mother, the less likely children are to be skilled in emotion regulation or prosocial behaviors (Howell et al., 2010). All risk factors influence early child development, but these influences can be lifelong, especially with trauma events.

Complex Trauma

Traumatic events involve experiencing or witnessing intense situations. These include experiences of kidnapping, threat of physical violence, physical violence, being a prisoner of war, threat of sexual violence, sexual violence, sexual experiences without violence but are developmentally inappropriate for children, torture, being taken hostage, severe car accidents, natural disasters, and terrorist attacks. Traumatic events also include the witnessing of unnatural death, threatened serious injury, serious injury, violent physical or sexual abuse, war, accidents, domestic violence, or a medical catastrophe involving one's child. There is also indirect exposure that is considered traumatic if the violent or accidental experiences affected close

relatives or friends. These experiences include suicide, serious injury, serious accident, and violent personal assault (American Psychiatric Association, 2013).

Complex trauma can be defined as multiple adverse experiences, either chronic or prolonged, that often occur early in life. These include interpersonal events, such as community violence, physical abuse, witnessing of family members being abused, and many other events (Cook, Blaustein, Spinazzola, & van der Kolk, 2003). This definition has also been expanded to include events that are overwhelming for children such as attachment separations, neglect, maltreatment, and poor caregiving experiences (Blaustein & Kinniburgh, 2010). Given poverty and its associated stressors, one can see a likely correlation between poverty and complex trauma. Trauma in childhood predicts many complications in adult life, including many health concerns (Center for Youth Wellness, 2017; Chen, Matthews, & Boyce, 2002; Felitti et al., 1998).

Over time, stressors and trauma can lead to toxic situations for both parents and children. Toxic stress is a term used to describe a physiological response when people experience these intense stressors or risk factors. More specifically, toxic stress is defined as “strong, frequent, or prolonged activation of the body’s stress-response systems” (Shonkoff, Boyce, & McEwen, 2009, p. 2256). Chronic or uncontrollable stressful events trigger toxic stress responses that children often experience without appropriate adult support (National Scientific Council on the Developing Child, 2005/2014). The severe consequences of toxic stress include a disruption in brain structure development, lower thresholds for stress management, and negative influence on other organ systems. In addition, poverty reduces cognitive capacity, potentially due to the mental capacity needed to handle poverty-related concerns (Mani, Mullainathan, Shafir, & Zhao,

2013). Without early intervention, these effects of toxic stress persist into adulthood and cause many risks for stress-related diseases in adult life (Shonkoff et al., 2009).

Effects of Risk Factors

Frequently experiencing stressors and toxic stress in early life is concerning, as many long-term effects in adulthood have been discovered in longitudinal research. In fact, early adverse environmental influences are at least as important, if not more important, than genetic predispositions in an individual's risk of chronic health conditions later in life (Center on the Developing Child, 2010). Children in low socioeconomic status typically have lower health outcomes than children in higher socioeconomic status (Chen et al., 2002). One study suggests that higher exposure to poverty in childhood is associated with worse health as a child (Malat, Oh, & Hamilton, 2005). This adversity in early life increases the chance of early onset of depression (Oldehinkel, Ormel, Verhulst, & Nederhof, 2014), as well as increased mortality due to specific causes, especially cardiovascular disease (Cohen, Janicki-Deverts, Chen, & Matthews, 2010).

Further studies have elaborated on the specific long-term detrimental health effects of adversity early in life. Some of the most important studies that have been completed and are currently being studied are the Adverse Childhood Experiences (ACEs) studies. These studies look at the link between adverse childhood experiences related to neglect and abuse and the long-term effects. With the occurrence of adverse childhood experiences, there is a link to chronic diseases (Centers for Disease Control and Prevention [CDC], National Center for Injury Prevention and Control, & Division of Violence Prevention, 2016), risky health behavior (Felitti et al., 1998), social and emotional problems (Edwards, Holden, Felitti, & Anda, 2003) early death (Anda et al., 2009), and low life potential (Centers for Disease Control and Prevention

[CDC], National Center for Injury Prevention and Control, & Division of Violence Prevention, 2016). With an increase in the number of ACEs, there is an increase in the risk of these outcomes (Centers for Disease Control and Prevention [CDC], National Center for Injury Prevention and Control, & Division of Violence Prevention, 2016; Felitti et al., 1998). More specifically, with an increase in the number of ACEs there is an increase in the risk for stroke, obesity (Dong et al., 2004; Felitti et al., 1998), diabetes (Dong et al., 2004), asthma, myocardial infarction, depression (Felitti et al., 1998), smoking (Dong et al., 2004; Felitti et al., 1998), disability, coronary heart disease (Dong, et al., 2004), unemployment, mental distress, suicide attempts (Dube et al., 2001; Felitti et al., 1998), and lowered education attainment (Centers for Disease Control and Prevention, 2015). Furthermore, there is an increase in risky behaviors including alcoholism, illicit drug use, high numbers of intercourse partners, and more prevalence of sexually transmitted diseases (Felitti et al., 1998). As research continues, more evidence in support of these results is expected.

Effects of risk factors on the brain. Toxic stress also negatively impacts the brain's early development and architecture, which changes the way a child experiences the world throughout life (Center on the Developing Child, 2010; Shonkoff et al., 2009). With exposure to stressors, the brain overproduces neural connections in areas associated with fear, impulsive responses, and anxiety. While these neural connections increase, those that develop between the regions of behavioral control, planning, and reasoning may be underproduced (Shonkoff et al., 2009). In addition, when young children are exposed to less responsive care, the cortisol levels are higher than those receiving responsive care (Gunner & Donzella, 2002). High stress increases the stress hormone cortisol in the brain, which negatively influences the hippocampus, and therefore, memory ability (Farah, 2006).

These neurological changes also influence how children living in poverty experience stressors. Increases in cortisol levels in relation to toxic stress change the stress response. Children that have experienced toxic stress may have lower thresholds for typical stressors and may be triggered by events that are not stressful for most other children. This change indicates that the stress response is active for longer periods of time and occurs more frequently (Shonkoff et al., 2009). With the occurrence of early dysregulated experiences, there are also large changes to development of the emotion-processing limbic system; this is where the ability to adapt to environments, build attachment, and organize learning is developed (Schore, 2001). These abilities play a part in handling stress and developing relationships that help support resilience.

Risk Factor Influence on Development

As these risk factors are examined and researched, several overlapping areas in development appear most affected. The first area is the attachment relationship that the child builds with the caregiver. Another very important area of concern is self-regulation, which is both influenced by the development of the attachment relationship and has an influence on other related areas of development. Other areas that can be influenced by self-regulation include language development and social skills or relationship building with others, but these areas can also be affected on their own by the risk factors. Table 1 summarizes the connection between the risk factors, negative outcomes, and their impact in development as informed by the previously discussed research in four important areas: attachment, self-regulation, language development, and social skills. While some risk factors may have an impact on these four important areas, if there is no direct, identified connection in the research, it is marked as “N/A” in the chart. The table is followed by a detailed description of development and how it is influenced by poverty.

Table 1

Effects of Risk Factors on Development

<u>Risk Factor</u>	<u>Potential Outcomes</u>	<u>Developmental Area of Impact</u>
Punitive Parenting	Externalizing behaviors, negative adult relationships	Attachment Self-regulation Social Skills
Inconsistency in Parenting	Mental Illness	N/A
Maltreatment	Externalizing and internalizing problems, post-traumatic stress disorder, anxiety, depression, adaptive functioning, regulation, self-control, executive functioning, peer relationships, self-esteem, emotion regulation	Attachment Self-regulation Social Skills
Neglect	Cognitive function	Attachment Self-regulation
Early Deprivation	ADHD symptoms, externalizing disorders, internalizing disorders	Attachment Self-regulation
Parental Mental Health	ADHD, risk of depressive disorder or two or more psychiatric disorders, difficult temperament, peer difficulties, hyperactivity, emotional and conduct disorders	Attachment Self-regulation Social Skills
Parental Age	Increase risk of exposure to other risk factors	N/A
Increase in Family	Increase in food insecurity	N/A
Marital Discord and Interparental Violence	Externalizing and internalizing disorders; academic, behavior, and social problems	Self-regulation Social Skills Language Development

Table 1

Effects of Risk Factors on Development

<u>Risk Factor</u>	<u>Potential Outcomes</u>	<u>Developmental Area of Impact</u>
Divorce	Increase academic, behavioral, emotional, and interpersonal problems	Self-regulation Social Skills Language Development
Single-Parent Household	Smoking, low education attainment, higher levels of distress, higher risk of early pregnancy and inactivity	N/A
Absence of Father	Attachment	Attachment
Housing/Disadvantaged Neighborhood	Negative emotional and behavioral outcomes; increase exposure to other risks such as violence and traumatic events; inactivity	Self-regulation
No Daycare	Social inequalities; academic delays in reading, math, and writing	Language Development
Exposure to Violence (domestic violence)	Affects emotion regulation and prosocial behaviors	Self-regulation Social Skills
Toxic Stress	Lower thresholds for stress management, cognitive delays, stress-related diseases; cardiovascular disease, early onset of depression, social and emotional problems, early death, chronic disease, risky health behavior, stroke, obesity, myocardial infarction, suicide attempts, mental distress, unemployment, lower education attainment, risky behavior	Self-regulation Social Skills Language Development

Attachment

One of the more immediate but long-term effects of living in poverty and experiencing many risk factors includes the disruption in building appropriate attachment relationships, which further leads to the inability to self-regulate. The primary attachment relationship in a child's life is the early caregiver relationship, which provides a child's first example of self and others (Blaustein & Kinniburgh, 2010; Cook et al., 2003). Often, the mother fulfills the role of primary caregiver. The presence of this maternal warmth also predicts self-regulation abilities later in life (Jennings et al., 2008). Furthermore, the attachment relationship is a building block that leads to developmental growth in many areas including communication, self-regulation, expressing emotions, exploration of the environment, and agency, or the development of independence (Blaustein & Kinniburgh, 2010; Cook et al., 2003). The attachment relationship supports many other important developmental capacities, so it is important to start with a healthy attachment relationship.

Development of attachment. The development of healthy attachment is not immediately present at birth, but is still in the process of developing through experiences and relationships with caregivers (Beckett & Taylor, 2010). The first behaviors, such as crying, promote close caregiver proximity, but such initial attachment behaviors are directed at a nonspecific caregiver (Ainsworth, 1989). Infants must signal to the caregiver and respond to the caregiver's signals. Through signaling and caregiver reciprocation, infants learn and start to regulate their emotional states as they develop (Duft, Stafford, & Zeanah, 2017). From birth until two months old, the child is not distressed when left with different caregivers; the infant also visually focuses on objects such as the face of the caregiver. This develops into a preference for the caregiver, if the caregiver attunes to the child's cries and coos (Beckett & Taylor, 2010).

At the next stage, between three to six months old, the caregiver and baby give feedback to one another. As the baby regulates with the response of the caregiver, attunement increases (Beckett & Taylor, 2010). The child responds differently to familiar people, with more focus and attachment behavior directed towards the caregiver. Between seven months and three years old, the child should display a clear attachment. The child has separation anxiety and actively seeks the caregiver to maintain contact (Ainsworth, 1989; Beckett & Taylor, 2010). After three years of age, there should be a secure attachment with a reciprocal relationship. This means the child and caregiver maintain regulation through a shared responsibility (Beckett & Taylor, 2010). While this sequence is how attachment commonly develops in young children, such may develop differently based on the caregiver's response to the infant's cues.

Types of attachment relationships. Depending on the quality and stability of the primary caregiver-infant relationship (Carlson, Hostinar, Mliner, & Gunnar, 2014), attachment relationships can be categorized into different types: secure, anxious-avoidant, anxious-ambivalent, and disorganized attachment. The first and healthiest is secure attachment. Attunement, in which the caregiver responds to the child's needs and is sensitive to the child's communication, helps a secure attachment and healthy relationship develop. With a healthy attachment, the child displays a preference for the caregiver over others, displays distress when separated from the caregiver, enjoys the company of the caregiver, and knows the caregiver will provide support (Beckett & Taylor, 2010). Without these characteristics, an insecure attachment is more likely to develop.

There are several different types of insecure attachment, the first being anxious-avoidant. With this type, the caregiver either rejects or shows insensitivity to the child's needs, teaching the child to almost eliminate the need for attachment (Beckett & Taylor, 2010). The child

presents this through behaviors such as a lack of distress when separated from the caregiver and ignoring the caregiver upon return (Ainsworth, Blehar, Waters, & Wall, 1978; Beckett & Taylor, 2010). The child will also behave similarly with caregivers as with other familiar or unfamiliar adults (Beckett & Taylor, 2010), and demonstrate low initiative in seeking physical contact from the caregiver (Ainsworth et al., 1978; Beckett & Taylor, 2010).

Another type of attachment, anxious-ambivalent, may appear strong but is actually an insecure type. The caregiver in this type provides inconsistent responses. The parent displays hostility or rejects the child, often lacking empathy when the child presents a need. In addition, being separated from parents for several longer periods of time and abandonment threats usually produce anxious-ambivalent attachment (Beckett & Taylor, 2010). The child has continued separation anxiety when the caregiver leaves with immediate distress (Ainsworth et al., 1978), but is not comforted by the return either. A child with this attachment pattern does not feel comfortable exploring the environment, as the child fears the caregiver will leave before the child returns. The child also tries to seek attention in any way, including trying to take care of the caregiver in a role reversal (Beckett & Taylor, 2010). Often, these infants are slower to be soothed and appear ambivalent when in contact with the caregiver, sometimes seeking close proximity and sometimes resisting interactions with caregivers (Ainsworth et al., 1978). The state of the attachment relationship is clear in both the behaviors of the child and the caregivers.

Recently, an additional type of attachment has been identified. Disorganized attachment develops when the caregiver scares the child. The child is not comforted by the caregiver but does not have anyone else from which to seek comfort. Here the caregiver is both the source and solution to the fears for the child (Duft et al., 2017). This type is present in abusive situations. The child demonstrates similar characteristics to the other insecure patterns, but usually with

more intensity. This disorganized attachment type is the most severe and more likely to lead to mental health and behavior problems in the present and future of the child (Beckett & Taylor, 2010). These different types of attachment are built primarily through the child's relationship with the primary caregiver, mostly with the use of attunement.

Attunement. The caregiver's attunement to the child is very important to the development of quality attachment. Secure attachment develops through healthy attunement from the primary caregiver and the child. Attunement is the caregiver's capacity to read the cues of the child, respond to those needs, and vice versa. The caregiver must be attuned not only on a physiological level, but also on a cognitive, behavioral, and emotional level. The important element of attunement is that the caregiver responds to the emotion underneath the behavior, rather than the behavior itself. Children that have experienced trauma potentially communicate needs through behavior, therefore creating a challenge to attunement for the adult and to coping with the emotion for the child (Blaustein & Kinniburgh, 2010). This creates a difficult situation for parents that have not built healthy secure attachments themselves due to the cyclical effects of poverty.

Effects of poverty on attachment. Attachment trajectories are even more difficult to predict when children experience a lot of adversity in early life (Prior & Glaser, 2006). Early experiences of adversity, whether environmental or biological, are important factors in the quality of attachment relationships that are built (Carlson et al., 2014). The attachment patterns are consistent in many different cultures and continue through adulthood. However, these patterns can shift with the occurrence of significant events, such as change in caregiving style, traumatic events, and a change in caregivers (Prior & Glaser, 2006). Children living in poverty commonly experience insecure attachment types, increasing negative effects on development.

Without the development of the secure attachment relationship, mental health concerns as an adult are more likely (Beckett & Taylor, 2010). Mental health concerns increase when any one or more of the following exist: no healthy attachment between six months and three years, evident early maltreatment leading to disorganized attachment, apparent insecure attachment relationships, loss or long-term separations from the attachment figure, and disorganized attachment that results from the caregiver's second-generation effect (Main, 1996).

Disruptions in early attachment relationships also influence adulthood experiences, including the ability to parent, to cope with loss, and to form relationships with others (Beckett & Taylor, 2010). Without intervention, these relationships are cyclical, meaning that the attachment capacity is passed on through generations. In fact, children are more likely to have disorganized attachment when caregivers themselves are fearful or have unresolved trauma experiences (Main & Hesse, 1990). Long-term, if a child experienced an insecure or disorganized attachment in development, it is more likely that the parenting style will be similar when that child becomes a parent (Beckett & Taylor, 2010). In addition, parents who struggle to provide the sensitive responsiveness needed to help build healthy attachment, often also struggle with more difficult temperaments, which are more present in insecure attachments. This struggle can lead to insecure attachments in early childhood as parents struggle to meet the needs of the child (Prior & Glaser, 2006). It is extremely difficult to break the cycle so that the caregiver can provide the attunement to their child and security that was never experienced, learned, or provided to them in their own childhood (Beckett & Taylor, 2010). Based on this research, interventions should not only address children's attachment and self-regulation needs, but also those of the caregivers.

Research has found attunement and responsiveness in parents are related to early development of social and motor competence (Bradley, Corwyn, Burchinal, McAdoo, & Coll,

2001). When a primary caregiver does not provide sustained external regulation for a child or a child experiences chronic trauma, the child's risk increases for difficulty regulating emotional and physical states (Blaustein & Kinniburgh, 2010; Cook et al., 2003). A child may even become guarded against any emotional experience, as the child may perceive such as potentially threatening (Blaustein & Kinniburgh, 2010). Trauma can influence many aspects in relation to the attachment relationship, including the ability to share emotional experiences, the ability to build secure attachment relationships, adult relationships, and positive relationships with peers (Beckett & Taylor, 2010; Blaustein & Kinniburgh, 2010). Trauma and its influence on attunement and the infant's attachment can also influence the infant's abilities in other developmental areas, including cognitive abilities, intrapersonal and interpersonal skills, language, school achievement, and regulatory competencies (Beckett & Taylor, 2010). Stable attachment relationships are vital to the formation of neurobiological development, promoting infant regulation and expanding coping strategies; this promotion then leads to the expansion of infant and adult health in a range of domains (Schor, 2001).

Self-regulation

Developmental competencies continuously build on previous tasks; if early developmental skills are not established, their lack will influence the developmental capacity of other skills later in life. Healthy attachment is a building block for self-regulation. The attachment system between caregiver and child provides a safe environment for the child to work on healthy development and co-regulation (Blaustein & Kinniburgh, 2010). The relationship between the parent and child helps facilitate development of key elements of co-regulation and self-regulation in a child that promote stability (Dallaire & Weinraub, 2005). Self-regulation is then a building block for learning (Shanker, 2013) and a key element to success in life. As a

child develops attachment through healthy relationships, the child is learning to co-regulate and eventually, self-regulate. The nurturing attunement of the caregiver helps develop the attachment and groundwork for self-regulation at the same time (Navsaria et al., 2017).

Self-regulation is a topic that many researchers are currently studying and redefining, but is influenced by the many risk factors associated with poverty. Self-regulation can be defined as “the act of managing cognition and emotion to enable goal-directed actions such as organizing behavior, controlling impulses, and solving problems constructively” (Murray, Rosenbalm, Christopoulos, & Hamoudi, 2015, p. 5). It is important to note that self-regulation is a key component for lifelong functioning in all areas (Murray et al., 2015), creating a skill that is needed in everyday life to learn and make decisions (Buckner, Mezzacappa, & Beardslee, 2003; Murray et al., 2015). There are many behaviors associated with self-regulation, which are divided into separate but related domains.

Self-regulation can be understood as having three different domains: cognitive, emotional, and behavioral self-regulation. Cognitive self-regulation can be observed as the ability to maintain attention, ignore distractions, make decisions or goals, retain information, self-monitor, and problem solve (Murray et al., 2015; Shanker, 2013). Emotional self-regulation is the ability to adapt in situations that are emotionally arousing and manage unpleasant or strong feelings. One must be able to understand feelings and manage or self-calm internal stress (Murray et al., 2015). Intense negative emotions make it difficult for children to remain regulated, and as a result make it difficult to focus attention (Shanker, 2013). Finally, behavioral self-regulation is observable in skills such as impulse control, following rules, setting goals, and using coping strategies. Cognitive and emotional self-regulation are building blocks for

behavioral self-regulation (Murray et al., 2015). Self-regulation behaviors and skills set the precedent for children to learn and should continue into adulthood.

Development of self-regulation. The ability to self-regulate is first developed by external or co-regulation with an adult, through the process of attachment building. External or co-regulation can be defined as a caregiver fostering the needs of the child through nurture, coaching, following emotions and the child's lead, assisting the child when identifying the need, comfort, and redirecting to help foster the experience of emotions and situations that are potentially challenging (Gulsrud, Jahromi, & Kasari, 2010; Murray et al., 2015). Co-regulation and self-regulation are therefore developed through appropriate caregiver support with attunement. For example, an infant under the age of one needs a caregiver for external regulation to co-regulate by using warm and nurturing methods, responding to needs, keeping stress in the environment to a minimum, and comforting the infant when stressed (Murray et al., 2015). When the caregiver assists the child to regulate those needs, the caregiver not only builds secure attachment, but also helps the infant learn to regulate feelings (Schoore, 2001). In toddlerhood, the child starts to select and shift attention, as well as delay gratification. The caregiver co-regulates with the child by having rules and consequences, calming the child when upset, and practicing self-calming strategies with the toddler (Murray et al., 2015). Infants and toddlers mostly function with co-regulation and are not ready to self-regulate.

The ability to self-regulate begins to develop around the age of three. Between the ages of three and five, co-regulation decreases while the child's capability of self-regulating increases. Self-regulation skills include the ability to: focus attention for short periods of time, delay gratification for extended periods of time, handle distress without the caregiver, cognitively plan behaviors in different situations, use language within emotional situations, and follow rules. At

this point, the caregiver takes an important supportive role. The caregiver continues to co-regulate with a preschooler by modeling self-calming methods and coaching different behaviors. These behaviors include coaching children to use words to express emotions and needs, coaching rules, and including consequences for self-regulation (Murray et al., 2015). These behaviors are both important for learning and successful life skills.

Self-regulation not only influences development but is essential to success in the learning environment. Successful regulation behaviors include the ability to follow directions, sit quietly, and maintain attention on challenging behavioral or cognitive tasks (Raver et al., 2011). Controlling attention is important to the school setting; the child must adjust attention behaviors to try to reach norms and goals, learn to persist through hard tasks even with delayed reward, maintain focus through distractions, and use reasoning to connect current decisions to consequences in the future (Rueda, Checa, & Cómbita, 2012). Executive functioning also includes the ability to strategically problem-solve, be diligent, have discipline to complete tasks, and be well organized. These skills are extremely important to being able to learn both in the present and future. If self-regulation skills are strongly developed at the preschool age, youth then have effective emotion regulation and executive functioning exhibited and can maintain focused attention, concentrate, consider alternative solutions, think rationally, and use both abstract and formal answers to problems. Youth with strongly developed self-regulation also have strong emotion regulation, are able to modulate the expression of feelings, manage emotional states, and display feelings in acceptable methods (Buckner et al., 2003). These skills are used in daily life and are essential to successful living, learning, and resilience.

For children, self-regulation is observed through different behaviors either in the classroom or during daily activities. These behaviors strongly resemble the three different types

of self-regulation and skills needed in the learning environment described above. However, when children are not regulated, the behaviors are often the opposite. Children can display aggression or impulsivity, struggle with inhibitory control, have an inability to focus or maintain attention, appear withdrawn, and have emotional meltdowns or tantrums (Murray et al., 2015; Pears, Fisher, Bruce, Kim, & Yoerger, 2010). Without the ability to self-regulate, children cannot focus and maintain attention to cognitively process and learn (Buckner et al., 2003). Students who exhibit higher externalizing behaviors are associated with lower performances in academics (Wiley, Siperstein, Forness, & Brigham, 2010). These dysregulated behaviors are common in children living in poverty, which become a focus of intervention with this population to increase success in the learning environment as well as life skills.

Effects of poverty on self-regulation. Stress in early life can lead to high stress reactivity in self-regulation, which can lead to developmental trajectories that are nonoptimal (Blair, 2010). Therefore, children living in poverty often struggle with the ability to self-regulate. Experiencing poverty can reduce cognitive capacity, potentially due to the mental capacity needed to handle poverty-related concerns such as food insecurity and attachment relationships. This is referred to as *psychology of scarcity*, meaning that when someone's cognitive capacity focuses on problems or anxiety such as food insecurity, there are fewer resources in the brain to maintain attention and problem-solve (Mani et al., 2013). Early dysregulating experiences can lead to not only an insecure attachment, but also alterations in the emotion processing limbic system. During this critical time of brain development, trauma decreases socio-emotional learning and leads to a deficit in the ability to adapt to emotional, or stressful experiences later in life (Schoore, 2001). For example, higher levels of internalizing symptoms are present in adolescents that experience higher rates of stress in early life (Ruttle, Armstrong, Klein, & Essex,

2014). Early learning is greatly influenced by social and emotional impairments, as well as conduct problems (Webster-Stratton, Reid, & Stoolmiller, 2008). There are clear disparities in areas of development including learning and self-regulation, especially when the home environment is not ideal in early life.

The early learning differences in development are typically present when disadvantaged children begin school and persist over time as children go through school (Crosnoe, Leventhal, Wirth, Pierce, & Pianta, 2010). Neglect and child abuse are a significant risk for future struggles in academics, discipline problems, and grade repetition, especially in elementary and middle school (Eckenrode, Laird, & Doris, 1993). Maltreatment of children impedes development of effective self-regulation skills and competencies for learning thus leading to behavioral symptoms and academic failure. These challenges in turn increase the risk for drop out, psychopathology, and social difficulties in later life (Shonk & Cicchetti, 2001). School-readiness is influenced by the ability to self-regulate and demonstrate pre-academic skills. Therefore, children living in poverty often experience negative effects on school readiness.

Language Development

There are also secondary areas that are influenced by poverty, including language and social development, that are connected to the development of self-regulation and intertwined with the development of attachment. Language and speech development is most intensive in the first three years of life, otherwise referred to as part of the critical period for these skills. Speech is the coordination of several muscles in the lips, jaw, tongue, and vocal tract that then generate the sounds of which language is composed, while language is the verbal and nonverbal expression of words and ideas (National Institute on Deafness and Other Communication

Disorders [NIDCD], 2017). Both of these are important developments that build on previous skills from birth, with the first three years being the most important for future development.

Development of language and speech. Communication starts at the very beginning of life, when infants cry to signal the need for food, companionship, or comfort. In the first year, the infant develops new skills rapidly. In the first three months, infants start to identify the primary caretaker's voice and if upset, calms down upon hearing it. The infant smiles when seeing or spoken to by the caregiver, react to loud sounds, coo, and have different cries for different needs. Development continues to increase between four to six months, when infants should be able to pay attention to music, use speech-like babbling with a few consonant sounds like *p* or *b*, visually follow sounds, laugh, use gurgling sounds when playing with adult or alone, babble when unhappy or excited, moves eyes in direction of sound, and notice toys that make sound. Finally, between seven months and one year, an infant starts to understand words for everyday objects, imitate speech sounds, babble with long and short sounds, look and turn toward the direction of sound, communicate with gestures, have one or two words, babble to get or keep attention, and respond to some directions or requests (American-Speech-Language-Hearing Association [ASHA], 2017; NIDCD, 2017).

Language development continues in toddlerhood. Between one to two years old, a toddler should learn new words regularly, typically gaining new words every month (ASHA, 2017). The toddler also typically starts to speak with two words together, uses multiple consonant sounds for beginning of words, follows simple directions, knows and points to a few body parts, points to pictures in books, and uses some questions with one or two words. Skills continuously build on previously developed skills between two and three years old. In this period, a toddler commonly will have a word for most everything; use consonant sounds including *k*, *g*, *t*, *n*, *f*, and *d*; use

phrases with at least two to three words; name objects around them to request them or draw attention to them; and speak in a way that is understandable to friends and family (ASHA, 2017; NIDCD, 2017). These first three years are extremely important to the development of language, but poverty's risk factors can interrupt this healthy development.

Effects of poverty on language development. In the same way that attachment and self-regulation are influenced by the stressors and risks of poverty, there is an increased risk for language and behavior problems for children living in low-income families (Qi & Kaiser, 2004). There is also a co-occurrence of language delays and behavior and social problems in children in preschool (Cambell, Shaw, & Gilliom, 2000; Qi & Kaiser, 2004). Language ability is associated with socioeconomic status, including phonological awareness, vocabulary, and syntactic ability (Farah et al., 2006). Children who have witnessed domestic violence have lower language abilities than those that did not (Huth-Bocks, Levendosky, & Semel, 2001). As a part of the risk factors and environment of poverty, parenting-related stress negatively influences children's language development, potentially due to the strain poverty places on the parent-child relationship (Vallotton et al, 2012). In addition, poverty-related home disorganization early in life (such as noise, messiness, and household density) is a significant predictor of receptive and expressive language despite other potential covariates (Vernon-Feagans, Garrett-Peters, Willoughby, Mills-Koonce, & The Family Life Project Key Investigators, 2012). Thus, different learning environments are presented to the child living in poverty.

The main difference for children living in poverty is the reduced exposure to language every day. Children growing up on welfare or low-income experience half the number of words that a child with parents from the average working class do in one hour, as mothers in higher socioeconomic status tend to talk to their children more often (Hart & Risley, 1995; Hoff et al.,

2002). Children of lower socioeconomic status have less advanced language skills when compared to children of the same age but in a higher socioeconomic status. Also, these differences in vocabulary size begin in infancy and increase as children develop, so that by the age of 3, children living in lower socioeconomic status have 500 fewer words in their vocabulary than children living in higher socioeconomic statuses (Hart & Risley, 1995). In addition, mothers of higher socioeconomic status typically talk to their children for the purpose of conversation, while mothers of lower socioeconomic status are usually directive when speaking to their children (Hoff et al., 2002). These differences, whether cultural or influenced by other risk factors, put the child at-risk for later delays in language and learning.

Social Skills

Similar to language development, social skill development is influenced by poverty and intertwined with attachment and self-regulation development. The development of social skills starts at birth and occurs through experiences with adults. In the first year of life infants explore themselves and the world around them. From birth to three months, infants react positively to touch, show pleasure or smile when socially stimulated, and can be comforted by a familiar adult. When infants are between three to six months old, they may start to initiate small social interactions such as laughing, smiling, and paying attention when hearing their own name. Between six to nine months, infants distinguish familiar people from strangers, show a strong preference for familiar people, can express different emotions with different cries, respond to gestures and language, and get upset when losing a toy. By nine to twelve months, infants start to imitate others more through mimicking gestures or simple actions, and also display anxiety when separated from the caregiver (Public Broadcasting Service [PBS], 2017). This social

development is based on the caregiver's attunement and interactions and develops simultaneously with the attachment bond.

Social skills become much more present between year one and two for a toddler (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). At this age, a toddler is more likely to initiate a social experience with others and express more emotions. In this year of development, a toddler begins to: help when a caregiver is cleaning up or engaging in other tasks, imitate adult behaviors when playing, make faces or smile at him or herself in the mirror, recognize him or herself in a mirror or picture, play alone and initiate play, express negative emotions, and show affection for caregivers and familiar people (PBS, 2017). Interactions with others become more complex and occur for longer periods of time (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). Children between two and three years old become more social with other children, but also more individually aware. These children develop a stronger sense of self and individual preferences. Other behaviors demonstrating individuality include: verbalizing "no," displaying aggressive behaviors or feelings, exhibiting awareness of one's own feelings as well as others, and experiencing mood shifts. Children in this age range develop social skills with others and exhibit behaviors that include: parallel play, defending possessions or objects, watching other children and sometimes brief associative play, symbolically using objects in play, demonstrating early pretend play, and participating in group activities. After a child turns three, it is more likely to see sharing and turn-taking, initiating or joining in play with others, creating games with other children, and the beginning of dramatic play or more pretend play (PBS, 2017).

Social skills are influenced in the process of building attachment and self-regulation skills. In fact, socialization and the development of personality in a child are influenced by the ability to control behavior, otherwise referred to as self-regulation (Rueda, Posner, & Rothbart, 2005). Elements of self-regulation such as planning and problem-solving are required in the process of making friends, solving conflicts with others, and seeking attention from others. Therefore, self-regulatory abilities must develop at the same time or before healthy socialization can occur (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). Positive parenting and positive parent-child interactions are able to promote resilience through facilitating the development of prosocial skills and emotion regulation. This is done through the use of responsiveness, warmth, and appropriate discipline (Howell et al., 2010). Children who have healthy peer interaction usually have healthy attachment relationships with parents first, as well as parents that foster and encourage interactions with peers (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). With the absence of this appropriate social development, there are important negative effects that must be considered.

Effects of poverty on social skills. When children and infants are exposed to risk factors and trauma, social skills are greatly influenced. When exposed to trauma, children can have impaired development in intrapersonal and interpersonal skills. In particular, the ability to interpret cues of others and positive relationships with peers are negatively impacted. This influence carries into adult relationships and having a positive self-concept throughout life as well (Beckett & Taylor, 2010). In addition, trauma affects the ability to share emotional

experiences with others (Blaustein & Kinniburgh, 2010). When social impairments are present, it also greatly influences early learning for the child (Webster-Stratton et al., 2008).

Language development and social skills are closely related to attachment and self-regulation, meaning intervention could potentially address all of these areas. Self-regulation includes the ability to maintain attention, have impulse control, make decisions, and verbalize emotions, among many other important skills. When these skills are not present, it often keeps the child from being able to participate and learn with the group. For example, a child struggling with impulse control and demonstrating aggressive behavior is often taken to an area to calm down away from other children, limiting the child's social experiences. In addition, this behavior can push other children away, further keeping the child from having positive social learning experiences. This creates a cycle, as the child may wish to be social with other children but is unable to control impulses, which pushes friends away that can then create more negative behaviors in self-regulation. As issues with self-regulation are very common in children with poverty, it is also common to see effects on social interactions.

Intervention and Resilience

Intervention and prevention can lead to different outcomes for children living in poverty. Developmental competencies related to attachment, self-regulation, language, and social skills can lead to resilience in individuals with proper intervention (Blaustein & Kinniburgh, 2010). Resilience is characterized by positive changes in development despite significant stressors or trauma that could interrupt development and learning skills (Easterbrooks, Driscoll, & Bartlett, 2008). Each individual child presents with different outcomes despite risk and protective factors, as individual characteristics and relationships greatly influence the child. This is where resilience can be identified, as many children are resilient despite multiple risk factors in life. The goal in

intervention is to create more protective factors than risk factors, or to support the most important protective factors, in order to have more resilient outcomes.

Protective Factors

Protective factors are those factors that help create healthy outcomes and resiliency by reducing the risks or providing more important supports. Protective factors can include warm or supportive parenting, social or cultural support, consistent parenting, stable foster care, involvement in the community, structure in the classroom, constructive conflict, comfortable income, parent's good mental health, and access to parks in safe neighborhoods (Navsaria et al., 2017). Most protective factors can be seen on a continuum from risk to protective, with protective often including either intervention or the absence of the risk factor. It can also include intervention in development of mental health. Positive functioning and potential resilience is associated with emotion regulation and prosocial skills in preschool children (Howell et al., 2010).

The ability to use self-regulation skills is a characteristic of, and protective factor among resilient children. Self-regulation skills include both executive functioning and emotion regulation skills. In addition, other predictors of resilience include higher parental monitoring and intelligence (Buckner et al., 2003). Nurturing environments can help prevent a wide range of mental, behavioral, and emotional disorders and potentially reduce poverty, mental illness, academic failure, and abuse and neglect in families. These nurturing environments teach self-regulation skills, promote prosocial behaviors, minimize toxic events, limit potential opportunities for problem behaviors, and provide a space to be aware of one's feelings and thoughts (Biglan, Flay, Embry, & Sandler, 2012). Since self-regulation skills are a common

factor in resilient children, it would be good practice to address both attachment and self-regulation for children living in poverty to increase resiliency.

In addition, the quality of daycare contributes to childhood outcomes (Navsaria et al., 2017). Children who live in low-SES homes that do not attend daycare or child care services are at greater risk of negative outcomes. Early and high intensity child care services can become a protective factor for children living in low-SES, eliminating the difference between low and adequate SES in academics including reading, mathematics, and writing, as well as social inequalities in adolescence (Laurin et al., 2015). This protective factor appears even more effective when services at the daycare help address the parent's needs as well as the child's development of self-regulation, language development, and social skills.

One protective factor that is key is preventive intervention before the age of three. Within the first five years of life, humans rapidly go through complex developmental changes. This is potentially a sensitive period (Navsaria et al., 2017), which is the time in development for different areas of growth. These developmental areas include: social-emotional and neural and cognitive development, during which a system is more susceptible to experiences (Troller-Renfree & Fox, 2017). Without proper development during this sensitive period, the brain structure potentially changes, abnormal patterns in attachment can occur, deficits in executive function may be present, and differences in social behavior may occur (Troller-Renfree & Fox, 2017). Also, the growth of brain structures that influence stress in the body are impacted by these experiences between the prenatal and childhood periods (Gunnar, Fisher, & The Early Experience, Stress, and Prevention Network, 2006). These experiences can either hinder or promote optimal development of the child (Navsaria et al., 2017).

Children experience sensitive periods early in life in three areas of development related to mental health including neural development, cognition, and social-emotional development. There are also several sensitive periods related to deprivation and environmental risk factors that children living in poverty may experience (Troller-Renfree & Fox, 2017). Behavior and cognition are still malleable, and learning at this age sets the child's attitude toward learning, implying potential lifelong benefits for the child originally at high risk for school difficulties (Webster-Stratton et al., 2008). Studies have suggested that the sensitive period for executive functioning, which is directly related to self-regulation development, could occur as early as the first year to 18 months (Merz & McCall, 2011). In addition, the first three years of life may be a sensitive period for internalizing and externalizing disorders (Humphreys, McGoron, et al., 2015). There may also be a sensitive period for indiscriminate social behavior, such as being overly friendly toward adult strangers, between six months and two years old (Troller-Renfree & Fox, 2017).

Since children in poverty experience so many stressors and threats to healthy development, early intervention and intervention during infancy and toddlerhood is vital. This intervention during infancy, toddlerhood, and preschool provides a foundation for learning in preparation for school readiness and kindergarten, as well as prevents larger discrepancies in development in the future. During the first five years of life, critical brain areas develop that promote good health, executive functioning, and self-regulation (Center on the Developing Child, 2010; Murray et al., 2015). Toxic stress influences the developmental trajectory even more when it occurs at a time of high developmental plasticity (Hamoudi, Murray, Sorensen, & Fontaine, 2015). For example, research suggests that low self-regulation or excessive crying in infancy may influence the developmental trajectory of the male child's emotion regulation

(Stifter & Spinrad, 2002). There exists potential to identify higher-risk children demonstrating early-onset behaviors who are also living in high-risk environments before the age four or five years old. These children appear to be at highest risk for problems in adjustment later in school (Cambell et al., 2000). Long-term deficits in academic, cognitive, and language skills have also been found in children that have early language impairments compared to children that did not (Johnson et al., 1999). Earlier intervention, even before the age of three, is key to promoting resiliency, influencing sensitive periods of development, and promoting future success in school environments.

Literature suggests that a child-centered, holistic approach that is individualized to the protective and risk factors and needs of the child is the best approach to services and interventions (Holt, Buckley, & Whelan, 2008). Research suggests that some current interventions are more effective, including when they are multigenerational and when they address key areas of development and need (Holt, Buckley, & Whalen, 2008; Howell et al., 2010). Thus, intervention should take a systemic approach, serving at least the mother and the child (Howell et al., 2010).

Interventions should focus on factors that could potentially promote resiliency and assist healthy development. This type of intervention means targeting the protective factors that can be addressed through the intervention rather than the risk factors that require more assistance (Bush & Eisenhower, 2013). Prevention involves interventions that aim to alter developmental processes through protective factors (National Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009). Self-regulation has been found responsive to intervention and therefore can be targeted not only in

early intervention but throughout life (Murray et al., 2015). However, addressing self-regulation means also addressing attachment and healthy relationships, language development, and social skills. The following interventions are some of the existing related interventions that have been used for these areas of behavior.

Existing Intervention Designs

Multigenerational interventions before the age of three have the capacity to counteract the parenting risk effects on language and other areas of child development. Research notes that interventions should address the parent-child interaction, parent stress from parenting, and the parent's overall stress and symptoms (Briggs-Gowan et al., 2010; Vallotton et al., 2012). To help reduce the risks of child abuse, household dysfunction, and domestic violence that are common in families with alcoholism, it is necessary for intervention to include more identification and treatment of the parent (Anda et al., 2002). While the child should receive intervention for handling the traumatic stress, it is beneficial to the child for the mother to receive mental health services and parent guidance to provide support for the child. Such a systemic approach looks at more than just the child and includes more of the factors influencing the child (Howell et al., 2010).

Children receiving intervention for self-regulation demonstrate higher impulse control and attention skills regardless of initial skills (Raver et al., 2011). When faced with challenges, most people demonstrate positive functioning. In fact, despite lack of a caregiver or secure attachment relationship, formation of the attachment system is still possible in most children (Carlson et al., 2014) with both a primary attachment figure, as well as alternative attachment figures (Prior & Glaser, 2006). Also, developmental plasticity allows remodeling in the brain architecture, an important characteristic of resilience (Hamoudi, Murray, Sorensen, & Fontaine,

2015). Interventions focusing on these skills of executive attention, within self-regulation, have the potential to help children be more successful in school (Rueda et al., 2012).

Early compensatory education interventions decrease reactivity through experiences with people that are supportive and nurturing. Interventions should also be in an environment that is structured as well as stimulating. These interventions help support competencies that are important to success throughout life (Blair, 2010). In addition, preschool curricula promoting emotional self-regulation and social competence with children in poverty has shown significant improvement of conduct problems such as following rules and directions, less aggression (verbal and physical), and smaller occurrence of negative affect. This intervention has also shown significant improvement in emotional self-regulation, off-task behaviors, and social competence. Results appear especially true for those children that have very low levels of school readiness and are initially the most at risk (Webster-Stratton et al., 2008). Past research demonstrates that a social-emotional approach is beneficial at the preschool age and with this population.

Head Start. One preventive intervention in the United States is Head Start. Head Start programs focus on school readiness for children between birth and five years old who live in low-income families. Early Head Start serves children until three years old and Head Start serves three to five-year-old children. Most programs are located in schools or centers, but there are also some home-based services. Some of these programs have partnered with preexisting child-care programs in order to provide even better services to the children. In total, more than one million children receive Head Start services each year (Administration for Children and Families [ACF], 2017). The inner-city child development center (ICCDC) discussed is a Head Start facility.

Head Start focuses on three areas that influence the child: family well-being, health, and early learning. Services supporting family well-being include the following: assisting with finances, housing assistance, education for parents, and providing programs to engage parents and increase parent-child relationships. In order to support health, Head Start programs provide nutritious meals, health and development screenings, and mental and oral health services; Head Start also connects families with outside supportive mental health, oral, and medical services. In addition, supports are in place to help physical, motor, and perceptual development. Finally, early learning focuses on school readiness through development of concepts, literacy, language, social skills, and emotional well-being. This development is assisted through play, healthy relationships with adults, and both spontaneous and planned instruction (ACF, 2017). This program alone is designed to reach many areas of need described above for children and families living in poverty.

While Head Start has shown improvements for children in academic areas, these improvements appear to be short-term. Parenting practices and parent-child relationships as well as health improvements were more long-lasting (U.S. Department of Health and Human Services, Administration for Children and Families, 2010). Moreover, focus should be placed on creating long-term changes in social-emotional and language to influence areas of need.

Problem Statement

There are many risk factors that accompany poverty, especially related to parental and environmental considerations. These risk factors can include parental mental health (Anda et al., 2002; Barona et al., 2016; Birmaher et al., 2010; Micali et al., 2014) and age (Navsaria et al., 2017), divorce (Ermisch & Francesconi, 2001; Kitzmann et al., 2003), family characteristics (Wight & Thampi, 2010), maltreatment and neglect (Bolger et al., 1998; Cowell et al., 2015;

English et al., 2005; Humphreys, Gleason, et al., 2015; National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000; Navsaria et al., 2017; Zeanah et al., 2013), parental practices (Bayer et al., 2008; Navsaria et al., 2017), neighborhood and housing quality (Evans, 2004; Leventhal & Brooks-Gunn, 2000; Navsaria et al., 2017), and exposure to violence (Fantuzzo & Fusco, 2007; Howell et al., 2010; Kitzmann et al., 2003). Research has demonstrated that each of these factors can influence early development in a range of areas, including (a) emotional outcomes (Amato, 2010; Bolger et al., 1998; Ermisch & Francesconi, 2001; Howell et al., 2010; Leventhal & Brooks-Gunn, 2000; National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000; Zeanah et al., 2013), (b) behavioral outcomes (Amato, 2010; Barona et al., 2016; Bayer et al., 2008; Cowell et al., 2015; English et al., 2005; Humphreys, Gleason, et al., 2015; Kitzmann et al., 2003; Leventhal & Brooks-Gunn, 2000; Micali et al., 2014; Navsaria et al., 2017), (c) academic outcomes (Amato, 2010; Ermisch & Francesconi, 2001; Kitzmann et al., 2003; Navsaria et al., 2017), (d) social outcomes (Amato, 2010; Barona et al., 2016; Bolger et al., 1998; Howell et al., 2010; Kitzmann et al., 2003; Micali et al., 2014; Navsaria et al., 2017), and (e) mental health outcomes (Anda et al., 2002; Barona et al., 2016; Birmaher et al., 2010; Dwairy, 2008; Emery, 1982; English et al., 2005; Humphreys, Gleason, et al., 2015; Micali et al., 2014). In particular, some of these risk factors include traumatic events, which place high stress on the family. When risk factors and trauma occur for long periods of time, it is often termed toxic stress. Toxic stress causes prolonged stress responses in the body (Shonkoff et al., 2009) and in turn influences overall health, brain structures, and stress management (Mani et al., 2013).

Adverse childhood experiences increase health risks in childhood and long-term into adulthood, including areas of mental health (Oldehinkel et al., 2014), chronic disease, risky behavior (Felitti et al., 1998), and early death (Anda et al., 2009). Children in toxic stress experience lower thresholds for stress and stress responses that are activated for longer periods of time and more frequently (Shonkoff et al., 2009). This greatly influences the brain, causing changes in structures and development. Influences on the brain include an increase in cortisol levels in children (Farah, 2006), some underproduced neural connections between regions of the brain that influence behavior control (Shonkoff et al., 2009), and changes in the areas of the emotion processing limbic system. These changes play a part in developing attachments, learning, and adapting (Schore, 2001), which are extremely important areas in development.

Building attachment to primary caregivers is vital to healthy development. This is not present at birth, but starts developing based on experiences and the relationship with the caregiver from the beginning of infancy (Beckett & Taylor, 2010). There are different types of secure and insecure attachment relationships including secure, anxious-avoidant, anxious-ambivalent, and disorganized attachment. How these different types develop are dependent on the caregiver's attunement and co-regulation with the infant. When early attachment relationships are disrupted or insecure, it influences the child's ability to form other relationships, cope, and to be a parent in the future (Beckett & Taylor, 2010). Therefore, this pattern becomes cyclical. Poverty and trauma influence the development of the attachment relationship, which in turn influences adult relationships, the ability to share emotional experiences, and positive relationships with peers (Beckett & Taylor, 2010; Blaustein & Kinniburgh, 2010). Attachment bonds are important to brain development, influencing mental health and the infant's coping strategies (Schore, 2001).

The attachment relationship is an important building block to the development of co-regulation and self-regulation. Self-regulation is still being defined, but can be described as the management of cognitive processes and emotions that lead to goal-directed behavior, such as controlling impulses and behaviors (Murray, Rosenbalm, Christopoulos, & Hamoudi, 2015). The ability to self-regulate is developed first by external regulation or co-regulation with the caregiver, through the process of attachment building and attunement. Between three and five years old, a child starts to increase self-regulation and experiences a decrease in the need for co-regulation (Murray et al., 2015).

Self-regulation can be described as having three different domains: cognitive, behavioral, and emotional self-regulation. Cognitive self-regulation includes abilities such as the ability to maintain attention, ignore distractions, and make decisions or goals (Murray et al., 2015; Shanker, 2013). Emotional self-regulation is the ability to adapt in situations despite unpleasant or intense emotions (Murray et al., 2015). Behavioral self-regulation builds on cognitive and emotional self-regulation and can be observed in skills such as following rules and setting goals (Murray et al., 2015). These skills of the different domains of self-regulation must be present for a child to learn. Poverty has a large impact on self-regulation, as stress in early life can develop into high reactivity (Blair, 2010) and a deficit in the ability to adapt to emotional or stressful experiences later in life (Schoore, 2001). Since self-regulation is imperative to learning, children living in poverty also experience a negative impact on school readiness (Webster-Stratton et al., 2008).

Language development is directly connected to the development of attachment and self-regulation. The first three years of life are a time of rapid growth for speech and language development, and the first five are considered a critical period. Each skill builds on the

previously developed skills and is a key component to future learning and development (NIDCD, 2017). By the age of three, a child should have a word for most objects, use several consonant sounds, use short phrases with two or three words, and speak in a way that friends and family can understand (ASHA, 2017; NIDCD, 2017). Language development is at an increased risk for families that live in low-income families (Qi & Kaiser, 2004), and frequently co-occurs with behavior and social problems (Cambell, Shaw, & Gilliom, 2000; Qi & Kaiser, 2004). Children living in lower socioeconomic status typically have a vocabulary with 500 fewer words and experience half the words in an hour with a caregiver than those living in higher socioeconomic status (Hart & Risley, 1995; Hoff et al., 2002).

Social skills are also intertwined with the development of attachment and self-regulation, as well as language. Social skills are dependent on self-regulation (Rueda et al., 2005), as socializing relies on planning and problem-solving to make friends and solve conflicts (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000). These skills start developing at birth. By the age of three it is typical see sharing and turn-taking, as well as initiation of play with others, starting games with others, and the very beginning of dramatic play or pretend play (PBS, 2017). When children have healthy peer interaction and social development, it is typical for them to have first exhibited healthy attachment relationships (National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development, 2000) and parent-child interactions that promoted prosocial skills and emotion regulation through warmth and nurturing (Howell et al., 2010). Poverty greatly influences this healthy peer interaction in relation to self-regulation. When the child is dysregulated, this behavior can keep the child from learning with the group, in addition to pushing peers away. This scenario limits the child's social

exposure and when the child desires peer relationships but is not accepted, the child may exhibit more negative social behaviors. There is then a cycle between self-regulation and social interactions. These two skills should be addressed in intervention at the same time.

Protective factors can promote healthier outcomes for children and families living in poverty by providing extra support or eliminating risks. Protective factors can include warm or supportive parenting, quality of daycare, consistent parenting, structure in the classroom, intervention for mental health, parent's good mental health, and access to parks in safe neighborhoods (Navsaria et al., 2017). Self-regulation and preventive intervention before the age of three are considered protective factors as well. During the first five years of life, the ability to self-regulate and demonstrate executive function are developing and are both critical to good health (Center on the Developing Child, 2010; Murray et al., 2015), but toxic stress influences this developmental trajectory even more when it occurs at a time of high developmental plasticity (Hamoudi, Murray, Sorensen, & Fontaine, 2015). This threat to early development is why it is important that intervention address self-regulation early in children living in poverty that frequently experience this toxic stress and the influence on development. Self-regulation has also been found to be responsive to intervention (Murray et al., 2015), making it a factor that can be addressed. Such intervention needs to occur earlier, as this development begins at birth. Intervention design should also be a child-centered, holistic approach that targets individualized protective and risk factors that are common in this population such as self-regulation, social skills, and relationships. (Holt et al., 2008).

Several types of intervention already exist for children and families living in poverty. The best approach is multigenerational and systemic. Research suggests that addressing both the child and parent in intervention, whether this is together or separately, is beneficial (Howell et

al., 2010). For the child, intervention should address self-regulation and executive functioning, as it increases impulse control and attention skills (Raver et al., 2011), as well as the potential for success in school (Rueda et al., 2012). A social-emotional approach that addresses self-regulation and social competence is also beneficial in preschools serving children living in poverty. Such an approach improves conduct problems, emotional self-regulation, off-task behaviors, and social competence (Webster-Stratton et al., 2008). A program in many preschools and daycares, Head Start serves infants and children from birth to five years old living in low-income families. The program focuses on school readiness. So far improvements from this program are short-term, as long-term changes have not yet been identified (U.S. Department of Health and Human Services, Administration for Children and Families, 2010).

Theory of Intervention

The targeted ICCDC serves a population that experiences poverty and the related risk factors. A not-for-profit organization located in the inner city of a major metropolitan Midwestern community, this ICCDC assists and serves many families living in poverty. Thus, the children being served may have also experienced or could be currently experiencing the varying effects of living in low-income or poverty. Over 400 children are served and cared for each day, between infant and 13 years of age. Of the families enrolled, more than 87% live below or much further below the federal poverty guidelines. The average income each month is \$1,500 or less among families at the ICCDC. Most of these families are single parent households led by women. About 20% of the children served by this organization are homeless or near homeless, possibly living in transitional living programs or homeless shelters (ICCDC, blinded for confidentiality, 2017). The most recently reported data for this ICCDC was taken in 2012. In that year, this ICCDC served up to 400 children from 6 weeks to 5 years old; most of the families

served would identify as African American. Many risk factors influenced these families, including homelessness, poverty, and single-parent households. Of the families that used services from the ICCDC, 23% of children were homeless, 94% of households were run by single mothers, and 88% of the families lived on salaries below the federal poverty threshold (Randell, O'Malley, & Dowd, 2015), which in 2012 was \$23,283 for a family of 3 including two children under 18 years old (DeNavas-Walt, Proctor, & Smith, 2013).

In 2012, the ICCDC also looked at the influence of the parental adverse childhood experiences (ACE) scores on the children's current level of adversity. Findings presented a better understanding of the situation and health of the families with children attending the facility. In this survey, 215 parents responded, or an 81% response rate, with only one survey per family. Results demonstrated that the parents' ACE scores were indicative of the child's current adversity. The strongest association with adversity presented when the parent had an ACE score of 4 or higher, with 32.1% of parents reporting an ACE score of 4 or higher. In addition, 42.7% of parents reported an ACE score between one and three. A much higher proportion of parents reported an ACE score of 4 or higher at the ICCDC being studied in this secondary analysis when compared to the general population and African Americans in the United States (Randell et al., 2015). For perspective, in the original ACEs study, 6.2% had scores of 4 or more (Felitti et al., 1998). In another study, when caregivers reported ACEs of 4 or higher, there were increased needs in the current situation related to food insecurity, income, adequate housing, insurance coverage, child's educational needs, and exposure to traumatic events, as well as a higher risk of low resilience scores and depression (O'Malley, Randell, & Dowd, 2016). These risks create an environment of toxicity and constant stress.

The hope is that with the early intervention and holistic practice provided to these families, resilience can be built and the necessary skills taught to empower individuals to better navigate current environments and existing risk factors. Music therapy is one therapeutic practice that is used at this ICCDC to address some of the influences of trauma. The music therapy program began with a donor-supported music therapist on site for two hours a week, as well as practicum students and a MT-BC faculty member from a local university. The program grew to employ one part-time music therapist and has expanded to include two full-time music therapists. In addition, other mental health services are available including play therapy and adult therapy. Therapy services programming has infant Theraplay® in the infant rooms, music therapy in the toddler rooms, and behavior intervention services in the preschool classrooms. Currently, children receive two years of group music therapy.

The music therapy program is one of change, always searching to evolve the practice. Originally, services were provided to children in the preschool rooms with three to five-year olds with a focus on academic and language-based goals. As the program grew, there also were services provided in the infant room 1-2 times per week over a span of ten years, as well as the provision of services in the toddler rooms for 9-10 weeks each spring semester provided by practicum students from a local university for 6 years. These services had a great impact on the future development of the program at the ICCDC. A few years ago, there was a shift in the program to be closer to an attachment-based model. At this point, the goals shifted to address self-regulation, language development, and social skills, and were tracked in each session. Along with this shift in goals, music therapy programming shifted to focus consistent intervention on group services with toddlers instead of preschool children, and individual services were provided

to any children with more intensive attachment and self-regulatory needs. The music therapy department currently continues to follow this program design and provision of services.

Trauma-Informed Music Therapy

One option in addressing self-regulation with a social-emotional intervention with children that have experienced trauma or poverty is the use of music therapy. Music therapy has previously been used with this population to work on self-regulation and the behaviors associated with it, as this is an area of concern that can be addressed through therapy when addressing the effects of trauma. More specifically, music intervention has been found to improve self-esteem and reduce aggression in adolescents (Choi, Lee, & Lee, 2010), not only within group therapy sessions but also in school behaviors (Currie & Startup, 2012). A study done with students with emotional and behavioral disorders found that music therapy helped the students improve self-regulation, social interaction, self-awareness, and attitude towards school (McIntyre, 2007). Music therapy can also help improve social competence in children who have social deficits (Gooding, 2011). The issue here is that most of these methods of treatment are occurring once a symptom from the effects of trauma and poverty has already developed or much later in life, rather than working from an early preventive model.

Common in the current research literature, interventions in music therapy are less defined and may use a behavioral approach. However, the best practice for this population is actually the use of preventive music therapy, as it focuses on developmental needs of a population rather than treating deficits (Hanson-Abromeit, Fisher, & Merz, 2013). Preventive intervention uses intentional interventions to help promote developmental competencies (Hanson-Abromeit, Fisher, & Merz, 2011) and focuses on the individual in a cultural context, including the family, society, and community (Hanson-Abromeit et al., 2013). This focus is extremely important, as

children who live in poverty and experience complex trauma are influenced by many cultural risk and protective factors. A preventive approach is used in this ICCDC.

Humanism. Preventive music therapy in this setting has a theoretical groundwork in humanism, systems theory, and attachment. Humanism has a few main tenets that are important to this population. Primarily, humanism acknowledges that everyone, in situations that provide opportunities for change, has the capacity to actualize the unique potential of one's own health and well-being (Abrams, 2015). This philosophy is especially important for the population identified for this intervention. With the proper resources or therapeutic processes, these families can reach their full potential, an opportunity that is not readily addressed in current practices.

The constructs of a humanistic approach that are also a part of music therapy include the client, goals, therapy process, and for music therapy specifically, the importance of the music. A humanistic approach focuses on who the client is rather than what the client needs (Abrams, 2015). The client is viewed as a whole individual. Furthermore, the goals of this approach focus on the client's pursuit of self-actualization, which is inherently relational. How the client relates to other people in the community, humanity, and society are a part of the client's self-actualization (Abrams, 2015). These goals can also relate to how a person interacts within their community and society. How these goals are addressed also changes how the therapy process is designed.

In addition, the therapy process and importance of music are unique in this humanistic and preventive approach. First, the process of this therapy is relational. The therapy process emphasizes how the client interacts with others and the environment that lead a client to deepen one's own humanization. In other words, the relationships are the therapy rather than a part of the therapy (Abrams, 2015). The relationship basis of humanism fits with the need to build

attachment skills in this population. The importance of music in humanistic music therapy is that it creates the space and the opportunity for the therapist and client to work together to address the goals (Abrams, 2015). With the combination of these constructs, the framework for a humanistic approach is appropriately designed to fit this population and fills the relational characteristics needed in preventive intervention to address attachment building, attunement, and social development.

Systems theory. Ecological systems theory also influences the theoretical framework of working with children in poverty. Originally developed by Bronfenbrenner, this theory is a set of different structures “nested” in one another. There are five areas to this theory including microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1993/1994; Neal & Neal, 2013). These areas, in addition to their interconnectedness, offer a better understanding of how culture and values influence individuals and the relationship of individuals to the environment (Neal & Neal, 2013). What happens at each level is important, as well as the transition and connections between the levels (Beckett & Taylor, 2010). Later theorists suggested that the various levels are “networked,” or overlapping one another (Neal & Neal, 2013). This theory creates a nice picture of the risk and protective factors within the systems.

The five different levels of systems theory align with the socio-environmental risk and protective factors that influence the child on a daily basis (Navsaria et al., 2017). First, the microsystem is wherever an individual is at that moment (Beckett & Taylor, 2010). This includes places such as school, classroom, and home. Microsystem-related risk and protective factors include but are not limited to daycare quality, therapy services, food resources, housing, parent availability, and direct environment quality (e.g. air quality or access to outside play). The

mesosystem is a network between all interacting microsystems in an individual's experience that essentially make up that world. Mesosystem-related risk and protective factors also include the relationship between the parents and child, relationships between parents and other family members, relationship between daycare teachers and the child, caregiver attunement, and the attachment bond. These are the areas that most directly influence the child and most closely surround the child.

The exosystem then includes all settings that influence a person, even when the individual is not present. Just one example of the exosystem within this population is the influence of parent situations, such as employment, on children. The macrosystem includes the cultural context that contains the smaller systems and is where values and ideology are emphasized (Beckett & Taylor, 2010). Within the macrosystem, factors such as cyclical relationships, cyclical poverty, authoritarian or harsh parenting, and inconsistency in parenting play a part. The final system, the chronosystem, involves changes over time in a big picture, such as changes to political system changes and health insurance affordability. An important concept of systems theory with this population is that all factors in a person's life influence each other. These systems, both as parts and a greater whole, are important to consider when looking at the treatment process.

Attachment and co-regulation through attunement. There is one other foundation that supports the theory of intervention in this population: attachment and co-regulation. As previously mentioned, secure attachment relationships are necessary for healthy self-regulation (Blaustein & Kinniburgh, 2010). Secure attachment relationships generally occur between the children and teachers, caregivers, and therapists; in addition to the primary attachment figures and alternative attachment figures, attachment behaviors can occur with professional caregivers

(Prior & Glaser, 2006). Effective interventions use attunement with each child to address developmental needs and build healthy relationships. Effective interventions also include practice of skills in a real-life setting and assist the child in processing those emotions within a social-emotional intervention. Play naturally addresses these relationships. Theraplay® is a specific play-oriented protocol that meets these attachment needs.

Theraplay®. A protocol that fulfills many needs of this population and is grounded in a theoretical framework that emphasizes empathy and attunement is Theraplay®. This approach is relationship-based, with a focus on playful interactions that are designed to help parents learn to provide guidance, regulation, safety, trust, and a sense of security to fill the needs of the child (Booth & Jernberg, 2010). However, this approach can also be used without parents. Key elements of healthy parent-child relationships that build social-emotional development include the following: playfulness, adult lead sessions, here-and-now experiences, relationship-focused interactions, multisensory experiences with an emphasis on appropriate touch, emphasis on right brain development, responsivity, empathy, attunement, and reflective practice. The goal of this approach is to establish or perfect emotional relationships between adults and children to foster change of the inner working model for both the child and adult (Booth & Jernberg, 2010).

There are four dimensions of Theraplay®: structure, engagement, nurture, and challenge (Booth & Jernberg, 2010). These dimensions are all areas of need for successful child-adult interactions. Structure provides physical and emotional security, allowing children to regulate and learn about the environment through initiation of interactions and limits. Engagement occurs when the child enjoys interpersonal contact, learns to communicate, and is emotionally connected, making the child feel valued. The child signals emotional engagement by looking, verbalizing, and smiling. Nurture activities are calming, reassuring, and necessary for secure

relationships. The adult anticipates and meets the child's needs and conveys to the child that the adult is safe and can be trusted. These activities allow children to internalize soothing abilities and learn to do it without the adult. Finally, challenge involves the adult guiding the child to take mild and developmentally appropriate risks, allowing the child to practice and master more arousing and tense situations. These activities are usually used to encourage and support the child's sense of capability. Such challenging activities help the child try new activities and feel confident and competent (Booth & Jernberg, 2010). Incorporating these four domains fulfill a child's needs in an attuned, social-emotional intervention.

The basis of music therapy intervention with children living in poverty at the ICCDC is preventive, with a philosophical orientation influenced by trauma-informed humanism, systems theory, attachment, and Theraplay®. Humanism emphasizes the importance of the relationship in therapy and the role of the relationship as the therapy (Abrams, 2015). Systems theory emphasizes the many factors that influence the child in several different systems, and that best intervention takes all of these into account. This could potentially lead to treatment of the parent and child. Attachment focuses on the building of healthy relationships with caregivers through attunement and co-regulation, which facilitates the development of self-regulation. Theraplay® uses the ideas of structure, engagement, nurture, and challenge to focus on relationship building and playful interactions through attunement and empathy at an appropriate developmental level. Almost all of the above components focus on the most important aspect for children who have experienced trauma and poverty: relationships. For children living in poverty and trauma, the building of healthy attachments, relationships, and then self-regulation are the most important areas in trauma-informed intervention.

Preventive Early Intervention Design

Based on the theoretical concepts of humanism, systems theory, attachment and co-regulation through attunement, the Theraplay® model, and the risk and protective factors of this population, music therapy interventions can be specifically designed to address the needs of children living in poverty. A humanistic approach fits effectively within music therapy, especially with this population. There are four constructs in humanism including relationship, being, holism, and agency. These constructs all fit into four primary areas of music therapy including music, clients, therapy processes, and therapy goals. The emphasis in humanistic music therapy is the relationship and process, while working on the client as a whole (Abrams, 2015). In addition, the music creates the space and the opportunity for the therapist and client to work together to address the goals. Interventions in humanistic music therapy are understood as opportunities for the client to work on self-actualization. These constructs of humanism directly address the attachment needs of children living in poverty, filling the social-emotional need for the children.

Systems theory also integrates with this population and music therapy; it is important to consider all the factors influencing each child, including community characteristics. Within each level of the system, there are multiple risk and protective factors that all need to be taken into consideration. While an intervention can only address some of the risks, it is important to know what other factors are creating stress in the child's life. Each of these risk factors can then also be connected to developmental characteristics that are affected the most between attachment, self-regulation, language development, and social skills. Thus, an effective intervention can address the risk or protective factors that promote the most resilience or most directly influence the child.

The levels of systems theory can be illustrated within the context of the ICCDC, the early classroom and music therapy. The microsystem is the classroom the child comes to every day. The next level, mesosystem, includes the interactions between the child's home life, classroom, the ICCDC, and music therapy groups. The exosystem is primarily the parent and their experiences with toxic stress and complex trauma (e.g. ACEs score), parental age and whether the child lives in a single or multi-parent household, and their current situations, such as job and relationships with others. The macrosystem is the population living in poverty, including the cyclical patterns within it. In addition, this level could include the area and culture, as well as the ICCDC itself. For this population, intervention should consider how each level influences development and continuation of self-regulation and attachment relationship formation, as well as success in music therapy. Therefore, integrating systems theory with the primary areas of need can help illustrate the primary focus for targeted interventions.

Figure 1 is a visual representation of the four main developmental areas of concern on a target within the context of systems theory. There are a multitude of variables influencing the child, with the majority of them influencing from the systems surrounding the child. Several of these factors on different levels can influence the child's risk of problem behaviors or mental, emotional, and behavioral disorders including community level characteristics, school quality, family resources, and individual qualities (National Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009). Therefore, the child is at the center of the system as the client of the targeted intervention because the child is surrounded by all the systems. The child should be considered as both an individual and in the context of the systems around them that shape their lives (National

Research Council (US) and Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, 2009). The four developmental areas intersect in the middle of the child as these skills are the important areas for the child to have targeted, healthy development. Factors that could be plotted include those described above within each system and in the risk factor section.

To use this as a visual or assessment tool for targeted intervention, there is a point for each risk factor on the continuum. Each factor is placed within the system level that is most applicable. The therapist can plot each factor that influences each specific child in the section that those risk factors influence. For example, if the child is experiencing exposure to violence, there would be a plot point in self-regulation and social interaction based on the chart previously discussed. Then the therapist is able to see where most the factors lie to inform treatment and decide which area each child needs addressed the most.

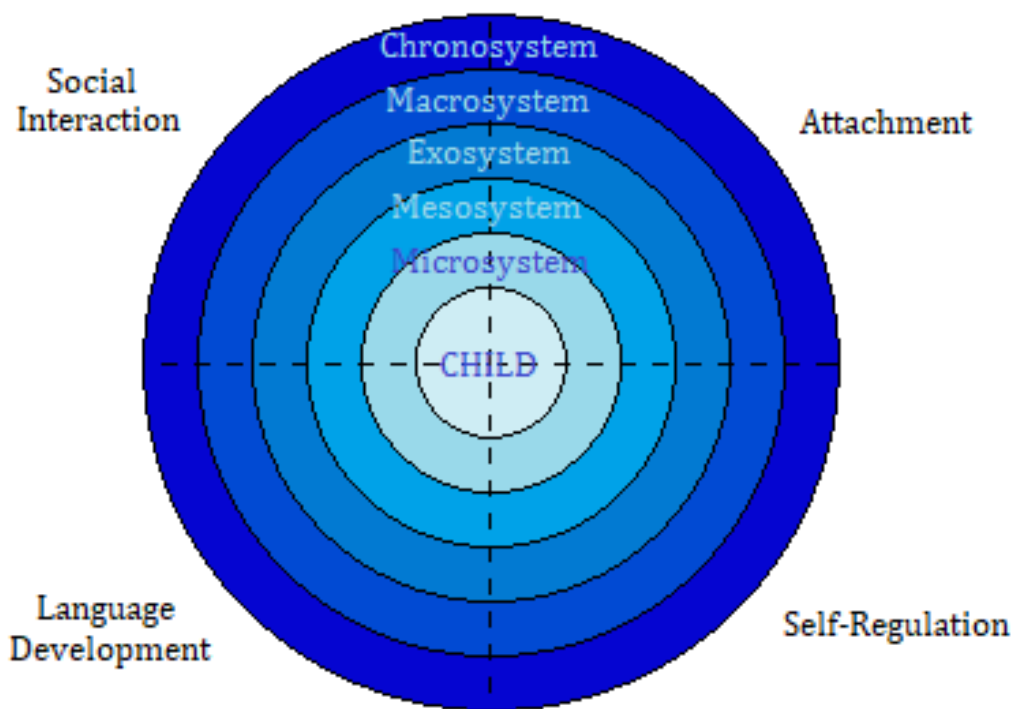


Figure 1. Systems Theory Conceptual Framework

It is imperative that the music therapy session be structured in a way that addresses the first developmental building block, attachment, through the use of attunement (Blaustein & Kinniburgh, 2010). Therapist attunement puts a focus on the relationship between the children and the music therapist. Music therapy processes naturally fit with serve and return interactions, or interactions where the adult is being responsive and sensitive to the cues and needs of the child (Center on the Developing Child, 2017). There are many opportunities in music that allow the music therapist to be silly with actions, lyrics, or prompts that make this natural within the music. The four areas of Theraplay® (structure, engagement, nurture, and challenge) all meet attachment needs and are easy and natural in music therapy. Structure exists through consistent elements of sessions that are the same every time such as day and time of intervention, as well as the sequencing of modules in the intervention. In addition, consistent transition, hello, and

goodbye songs provide structure for each session. The music provides the engagement for children, as music naturally interests most children. In addition, animation of the therapist creates a space for engaging, as well as serve and return interactions. Nurture in music therapy focuses on attunement through serve and return, validating client responses, and the appropriate use of touch (a component of the Theraplay® model). Finally, challenge is provided through both music and interactions, giving the child small, manageable steps to master within interventions. Music therapy in this setting uses all four foundation areas of Theraplay® to focus on the needs of this population; all of the areas should be included in each session. This model naturally fits with the playfulness that is needed in childhood, especially with children living in trauma (Degryse, 2010).

Music experiences with children living in poverty allow each child to practice within a healthy child-adult relationship and practice emotionally arousing experiences in a safe place (Sena Moore, 2015). For self-regulation, music can be organized to help children practice energy modulation and managing “big feelings;” this is particularly true for preschoolers, as music is appropriate in early childhood and commonly used in learning. In addition, music stimulates high and low physiological arousal and naturally creates a place of social interactions with adults and peers (Sena Moore, 2015). This arousal shift is a real situation for practicing self-regulation and energy modulation through the music.

A comfortable and engaging space to practice emotionally arousing experiences is provided through components that are developmentally and age appropriate, and provide an additional layer of structure in the context of the Theraplay® model. Songs should be designed so children can practice energy modulation, language skills, attention maintenance, or cognitive skills within the music experience. While language and cognitive skills can be practiced through

lyrics using syllables, phonemes, and repetition, attention maintenance may be less clear.

Children can practice attention maintenance through the individual music experience for the length of each song and the entire session, with demonstrations such as focusing on a music module and then shifting attention to the next module. Attention maintenance can also be practiced through the predictability and expectation of the ordering of music components in the intervention. Children can practice energy modulation by following the volume and tempo of the music. To fit the children's developmental level, repetition as well as novelty needs to be balanced within the session.

In addition, music therapy creates a safe place for children to explore but also provides structure through rules and boundaries. This structure allows children to experience limits and practice impulse control within the session. Consistent limits help children practice self-regulation in session and gives them the chance to practice real life behaviors with an attuned therapist and in a safe space. The most important aspect of music therapy in this setting is attunement through the session and filling the child's need in that moment. This includes setting or exploring limits as well as nurturing. The relationship with the therapist is the most important element of the intervention. In the next section, the intervention will be discussed in more detail and broken down further into the specific components and what those components are designed to address.

Chapter 3: Current Intervention with Children Living in Poverty: Therapist and Music

Attuned Co-regulation (TMAC)

There are approximately 266 children enrolled each year at the ICCDC who receive group education and therapeutic preventive services. Infants receive infant Theraplay[®], toddlers receive music therapy, and preschoolers receive social-emotional groups. This means that approximately 80 toddler-aged children receive targeted music therapy group services each year. Facility music therapists (not the researcher) developed the Therapist and Music Attuned Co-regulation (TMAC) intervention, specifically for young children living in poverty that have potentially experienced trauma (B. Corey, personal communication, January 2016-March 2017; E. Merz, personal communication, January 2017). The intervention was developed, implemented and refined by these music therapists for at least 2 years, with occasional implementation by music therapy practicum or interns under the music therapists' supervision. Currently, two board-certified music therapists are implementing the intervention, one of which is the researcher and the other is another music therapist (different from the developers of the intervention) employed at the ICCDC. The music therapists are each assigned to five of the ten toddler classrooms for group music therapy services using the TMAC. Each music therapist leads twenty-minute sessions for two-year olds and thirty-minute sessions for three-year olds, twice a week. These sessions occur year-round at a consistent time, typically between 9:00 and 11:00 A.M. Two teachers and eight children (when there is full attendance in the classroom) are present in each session.

TMAC is provided to children who are one to three years old, so children may receive anywhere from one to two years of the targeted intervention, TMAC, depending on their enrollment date. This intervention protocol has been used at the facility since 2012, and was

refined until the present time. Most children that attend the ICCDC are living in poverty and are primarily African American children, with a few Caucasian and Hispanic children. Thus far, this model has appeared effective at the ICCDC, and has been paired with continued evaluation and adjustments to best benefit the children.

Intervention Description

The primary focus of TMAC includes building healthy attachment relationships, in order to foster the development of self-regulation, language, and social skills, as these are the most commonly identified areas of need in the research and notes of those in clinical practice. The intervention was designed with the use of structure, engagement, nurture, and challenge based on Theraplay® (Booth & Jernberg, 2010). The music therapist also uses attunement to meet the individual needs of the children and co-regulation as the child is learning to self-regulate. Through these key factors, the music therapist can create a comfortable and engaging space for children to develop these skills.

This comfortable and engaging space is provided through TMAC's multi-component intervention, comprised of 13 components that are developmentally and age appropriate. The components include original compositions or pre-existing music commonly used with this age group. Songs are chosen based on the ability to practice energy modulation, language skills, attention maintenance, or cognitive skills embedded within the music. While language skills and cognitive skills are practiced through the lyrics using syllables and repetition, attention maintenance and energy modulation have a greater association with different characteristics of music. Children can practice attention maintenance through the song itself (length, engagement, actions), as well as practice energy modulation by following the volume and tempo of the music. Transition, hello, and goodbye songs provide the instructions and structure for children through

the lyrics. To provide both repetition and structure, the components of the intervention are planned in a specific sequence that is typically used in each session. However, each session can be tailored and modified in the moment to fit the needs of the children when requests and behaviors occur. Table 2 outlines the TMAC intervention.

Table 2	
<i>TMAC Intervention Outline</i>	
Opening Section	
<u>Component & Target Behaviors</u>	<u>Group State</u>
Rules Song <ul style="list-style-type: none"> ○ Scaffolds start of session ○ Prompts children with group rules ○ MT leads actions to reinforce rule concepts <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session Composed by Brandon Corey	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Hello Song <ul style="list-style-type: none"> ○ Low to high energy level, based on group state ○ Prompt children to wave hello or give high fives ○ Incorporate dancing/movement when older/more mobile ○ Assessing for energy level and mood, modify song based to match <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High

Table 2	
<i>TMAC Intervention Outline</i>	
Opening Section	
<u>Component & Target Behaviors</u>	<u>Group State</u>
Transition Song - Lotion Time (Tune: Mulberry Bush) <ul style="list-style-type: none"> ○ Leg patting on beat for entrainment/attention maintenance ○ Assessing eye contact: Prompt - “Let me see your eyes” ○ Assessing ability to initiate engagement w/ adults: Prompt - “Let me see your hands” <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Lotion - (Non-music) <ul style="list-style-type: none"> ○ Low energy level ○ Caregiver sits facing child noticing the child's features with words or gentle touches ○ Assessing for accepting nurture and ability to decrease energy state <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Modular Section	
Modular Component #1 - (Instrument/Regulation component) <ul style="list-style-type: none"> ○ Medium to high energy level ○ Can modify energy level from low to high to practice regulation ○ Start/stop, actions, or energy modulation interventions ○ Assessing for direction following, regulation, and attention maintenance <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High

Table 2	
<i>TMAC Intervention Outline</i>	
Modular Section	
<u>Component & Target Behaviors</u>	<u>Group State</u>
Transition Song – Put Your _____ (e.g. Shakers) in the Box – (Tune: If You're Happy and You Know It) or Goodbye _____ (e.g. Drums) <ul style="list-style-type: none"> ○ Transition song helps with increasing compliance from predictable routine ○ Assessing regulation maintenance during transitions <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Modular Component #2 – (Cognitive/language component) <ul style="list-style-type: none"> ○ Medium energy level ○ Simple vocalization sounds for younger children (babble sounds) ○ Incorporate more word-based games/books for older children ○ Typically singing based, sometimes with instrument play ○ Assessing for vocalizations, regulation, and attention maintenance <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Closing Section	
Transition Song – Make a Circle – (Tune: Are You Sleeping) <ul style="list-style-type: none"> ○ Transition prompt to changing seating to prepare for Stretchy Band intervention ○ Assessing regulation maintenance during transition <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High

Table 2	
<i>TMAC Intervention Outline</i>	
Closing Section	
<u>Component & Target Behaviors</u>	<u>Group State</u>
Stretchy Band Component <ul style="list-style-type: none"> ○ Medium to low energy level ○ Grounding/regulation component performed as a group ○ Actions performed as a group (Row Row, Wheels on the Bus) ○ Energy scaffolding downward until calm/quiet ○ Assessing for ability to decrease energy level <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Transition Song – Countdown “1-2-3”/Put Your Finger on Your Lips – (Tune: If You're Happy and You Know It) <ul style="list-style-type: none"> ○ Count 1-2-3 and say, “hands up!” ○ Prompt alternate action with hands (put finger on lips, i.e.: move hands away from stretchy band) ○ Assessing regulation maintenance during transition <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Fish & Feed – (Non-music) <ul style="list-style-type: none"> ○ Low energy level ○ Child eyes “fish” ○ Therapist hold in front of child’s face (12”+) see if child tracks object, able to hold gaze on object. <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High

Table 2	
<i>TMAC Intervention Outline</i>	
Closing Section	
<u>Component & Target Behaviors</u>	<u>Group State</u>
Goodbye Song <ul style="list-style-type: none"> ○ Medium to low energy level ○ Sung to whole group: “Goodbye Purple 2”, etc. ○ Sung twice, first time medium volume, second time whispered ○ Assessing for decreasing energy level <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High
Transition – Hand stamps <ul style="list-style-type: none"> ○ Sing only first phrase of Goodbye Song to individual child (“Goodbye <i>name</i>”) and wave goodbye ○ Allow child response delay time to verbalize “goodbye”/”bye-bye”, or wave based on developmental level ○ Give hand stamp/sticker ○ Assessing for eye contact and initiative w/ adults <input type="checkbox"/> Completed as prescribed <input type="checkbox"/> Modified in session	Regulation <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Engagement <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High

TMAC intervention outline. Adapted from music therapy field note, by Brandon Corey (B. Corey, personal communication, January 2016).

Every component of the intervention is addressing all four targeted developmental areas of attachment, self-regulation, language, and social skills throughout the entire session.

Throughout, the music therapist is providing a nurturing, comfortable space for the children while attuning to their needs. This nurturing environment addresses healthy relationship building as well as social skills. The session components are always addressing self-regulation in some

capacity, as attention maintenance is necessary for each component as well as co-regulation through attunement. Finally, language is addressed through the session as lyrics are used in almost every component, the therapist talks to the children, and there is prompting of language throughout the session.

It is important that throughout the intervention, the therapist be attuned to the needs of the classroom. This can be demonstrated through positive affect for most of the session, matching affect of a child that is feeling sad or angry, validating, reflecting, and following the lead of the child. For example, using phrases such as “you are mad that you didn’t get purple shakers” to reflect and label the feeling the child is presenting. Another example, if a child calls a picture in the component a “baby fish” you could use this term instead of the “planned” verse, following what the child is giving to the therapist. This also models to the teachers some ways to attune to the children in the classroom based on the children’s individual responses. Another important factor of each session in the TMAC intervention is that teachers engage with the children and use attunement in a similar way to the therapist. As teachers are the ones in the classroom with the children all the time, it is important that they are attuning to the children’s needs both inside and outside of group sessions.

The TMAC intervention can be thought of in three sections: opening, modular components, and closing. The opening includes the Rules Song, Hello Song, Transition (to lotion time), and Lotion Time. The middle section is comprised of two modular components and subsequent transitions that rotate every two weeks. The closing includes the Stretchy Band, Transition, Fish and Feed, Goodbye Song, and Hand Stamp Transition. Each component uses multiple music characteristics and the Theraplay® dimensions to focus on the areas of identified need in attachment and building healthy relationships, self-regulation, language development,

and social skills. It is also important to note that all components are written to be developmentally appropriate musically in all musical characteristics, but specifically in lyrics, harmony, and melody. The researcher discusses each component, how components address the Theraplay® dimensions, and the primary musical characteristic that facilitate the goals of the component.

Opening Section

The Rules Song is mainly a structural piece, establishing the start of session and setting expectations, presented through the lyrics. The song is sung a cappella to give the music therapist the opportunity to assess what behaviors to expect from a child that day. The Hello Song follows the Rules Song; it continues the provision of structure and adds nurture as the music therapist checks in with each child. Every child is greeted with the Hello Song individually, as well as presented with an opportunity to engage with the music therapist; this can be a verbal hello, a high five, or whatever the child chooses to initiate, a hallmark of the Theraplay® dimension of challenge. The Hello Song addresses social skills as children are singing to one another and engaging with familiar adults. This component uses lyrics and timbre, as the words are the greeting and the timbre of the guitar is a crucial part of engaging the children at the start of session. This is true due to the volume of the instrument that grabs the interest of the children and the familiarity of an instrument that is a part of each session, supporting the elements of structure, nurture, and engage. In addition, when classes have higher regulation and are older toddlers, challenge can be included in that children can dance on their turn and choose what they would like their “name” to be during the Hello Song, such as Tiger or Superhero.

The next component is a Transition song (to Lotion Time), which is sung a cappella. Like most transition songs, this one provides structure, but also provides nurture and engagement.

Each child has the opportunity to interact with an adult; the first verse prompts eye contact and the second verse prompts hand touches. The lyrics describe the actions the children will do, and physical prompts illustrate the actions. This transition is followed by Lotion Time, which is a Theraplay® based intervention that addresses nurture. In this component, there is little to no music, just interactions with the children on an individual basis. Each child, if one chooses, receives a small amount of baby-style lotion on their hand, arms, or legs. If the child desires to have help with the lotion, they can initiate interactions with the music therapist or teachers. The adults help the child rub the lotion in, often in a playful way that is also engaging the child. Since music is not a part of this intervention, the musical characteristics are not relevant.

Modular Section

The next section of the intervention is the modular components, which are considered modular as they are the components that rotate approximately every two weeks or four sessions. This period can be shortened or extended based on the children's regulation and mastery during the component. There are numerous options of components that the music therapists implement as part of TMAC, and the music therapists continue to write new components to fit here. These components integrate all four dimensions of Theraplay®. First, these components provide structure in that they are always the central part of the session, but they also help facilitate challenge as the music therapists rotate the modular components. These components are usually brought back later in the year, giving the children the opportunity for mastery. As these components change frequently, the researcher cannot generalize all of the diverse characteristics of the music. However, there are some characteristics that can be addressed as they are more consistently used. For example, tempo and dynamics are used to facilitate high and low energy, helping children safely experience high and low arousal. Fast tempos and/or louder dynamics

provide opportunities of high arousal, while slow tempos and/or soft dynamics provide opportunities for low arousal (Sena Moore, 2015). In addition, the lyrics frequently provide directions and engagement, as the topic usually is what interests the children. One of the modular components of each session usually includes an instrument to play such as shakers or drums, integrating engagement through timbre and the opportunity for interactive play. There is also a transition between these two modular components, which again addresses structure and provides direction through the lyrics. When the children in a classroom are more regulated there are some changes that the researcher has added as a clinician that can be made in this section to appropriately increase challenge.

Therapists may change the session by adding more challenging directives in the song, addressing impulse control more frequently, or by using components that involve identifying or engaging with peers. Another challenge is to add a third modular component, which is best fit for highly regulated classrooms but extends the session length by approximately five minutes. In the case of low regulation, can be helpful to take out one of the modular components so there is only one, use modular components that are adapted for younger children to meet the developmental need, or use more nurturing modular components.

Closing Section

Following the modular components, is the closing section, which begins with a Transition to the Stretchy Band component. This transition also provides structure and directions through the lyrics. The Stretchy Band component focuses on structure, engagement, and nurture. Structure is intrinsic because this component is always in the same place in the session and uses a song that is frequently used in their classrooms, thus making it more engaging for them as well due to familiarity. It can also provide them with a nurturing moment as the therapist sings the

song that is typically a favorite song. The Stretchy Band component uses a familiar song with lyrics that guide actions, as well as dynamics to decrease from high to low arousal. The children are all doing the actions together and holding the same object, which provides a focus on social skills as well as self-regulation. This component is followed by another Transition song (to Fish and Feed), which provides structure through lyrics and uses dynamics to bring the group to a low energy for the end of the session, supporting attuned co-regulation.

Fish and Feed is the next component, which is another Theraplay® based component that is not music-based. The primary focus of this component is nurture, as the adults feed the children the bite-sized crackers shaped like fish. Occasionally children will start singing some of the songs with fish that are used during modular components, so the music therapist will sing short phrases from it to provide that validation for the child. Such initiation is a hallmark of structure in the Theraplay® model. When a child is self-regulated they are more likely to initiate interactions or limits. It also illustrates engagement through the child's communication and singing. Nurture is also indicated by the therapist's attunement by integrating phrases from the initiated singing.

Fish and Feed is followed by the Goodbye Song, which provides structure primarily through the use of lyrics. Finally, this is followed by a Transition with hand stamps to end the session, which focuses on nurture, but also addresses structure, engagement, and challenge. This component does not use music, but rather the music therapist provides each child with a stamp if one chooses and gives the music therapist the opportunity to say goodbye individually to each child. This last component is a structured end of the session, while providing nurture through calming, reassuring, and trusting behaviors from the music therapist. In addition, engagement occurs through interpersonal contact with the adult and the opportunity to communicate choice

of where to put the stamp (hands, arms, or legs) or what sound effect they may want with the stamp (dog, car, mommy, etc.). Challenge is also presented to the child, as it gives the appropriate risk and practice opportunities to master arousing and tense situations such as saying goodbye and ending an activity and transitioning to the next.

Throughout each of these components, there are several opportunities presented by the children that are opportunities for the therapist to provide a nurturing environment and for the child to experience healthy relationships.

Current Measurement Design

The frequency, manner, and method of measurement of current TMAC intervention outcomes are based on the standard assessment method that tracks the child's development while enrolled at the ICCDC. In each classroom, teachers collect data using a tool called the Desired Results Developmental Profile® (DRDP) 2015 (see appendix) (California Department of Education, 2015). This assessment tool was developed by the California Department of Education and is to be used in natural settings, such as a classroom that the child is in on a regular basis. DRDP® includes a full developmental continuum of skills ranging from infancy to kindergarten. These skills are across developmental levels that build on one another, called responding, exploring, building, and integrating. Each skill level coordinates with typical development at different stages between infancy and kindergarten, and may have more than one skill set box within each stage. Responding scores are the level for infant, exploring for toddler, building for toddler and preschool, and integrating scores the level for preschool. Within each level there is a skill that is labeled as earlier, middle, or later, based on the order that skills develop (California Department of Education, 2015). These developmental skills can closely

correspond to the developmental skills addressed in the TMAC intervention in the specific areas of need for children living in poverty.

Outcome measures of the TMAC intervention use a measurement tool created by one of the TMAC intervention developers and previous facility music therapists (B. Corey, personal communication, January 2016) (see appendix). The music therapist collects data each session for each child on self-regulation, language development, and social skills. In each domain, the music therapist created a scale from one to five that aligns closely with the first five measures in the three categories of the DRDP® 2015 including Approaches to Learning-Self-Regulation for Attention Maintenance, Language and Literacy Development-Communication and Use of Language (Expressive), and Social and Emotional Development-Relationships and Social Interactions with Familiar Adults (California Department of Education, 2015). These scores are averaged in each domain for each student and for the whole class in the measurement tool.

A direct relationship between the TMAC intervention and the DRDP® on the original measurement tool was not explicit or easily translated to a different music therapist. Therefore, to show the connection from the TMAC to the DRDP®, the researcher created conversion tables to demonstrate the relationship between the two. Each skill set box in the DRDP® is assigned a number from one to five to correspond to the TMAC measurement tool, so that by the time of preschool, it would be expected for children to be receiving scores of four and five on the TMAC measurement tool to be on track developmentally in these domains. This matching is done for both the TMAC and DRDP® columns that are the closest for the same score. The TMAC assessment tool was different in 2015-2016 and 2016-2017 but the scales are comparable. These data are collected each session for each child with the tool for self-regulation, language development, and social skills. See Figures 2-7 for conversion scales.

In addition, after each session the music therapists complete a narrative field note that focuses on regulation and engagement of the group within each session (see appendix). There is a box set up like in the intervention outline to indicate a subjective assessment of the group's high, medium, or low regulation and engagement next to each component of TMAC (B. Corey, personal communication, December 2016), which is then linked to a graph for each session as well as an average for the month. To track intervention fidelity, there is also a box to check if the component was completed as prescribed or if it was modified. Next to this box, is a section to notate any important notes for each component, including modifications made in the moment, interruptions to session, changes in behavior, and specific modular component song titles. At the top of the document, there is also a narrative section for each child. This section is where the music therapists notate a general overview for each child of frequent behaviors, affect, and any dysregulated moments that occurred during the session.

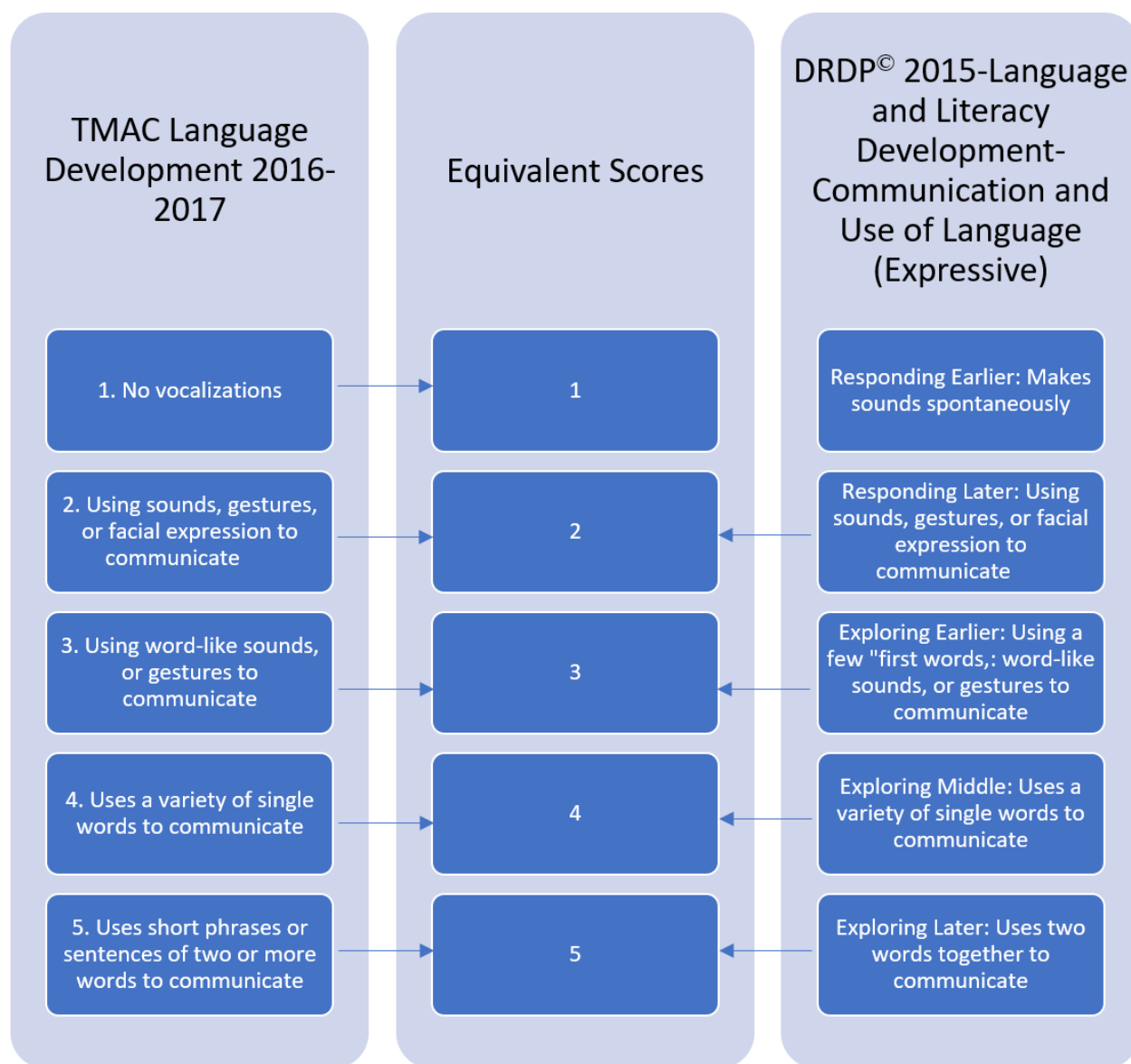


Figure 2. TMAC and DRDP® Language Development Conversion Scale 2016-2017
 DRDP® 2015 (California Department of Education, 2015)

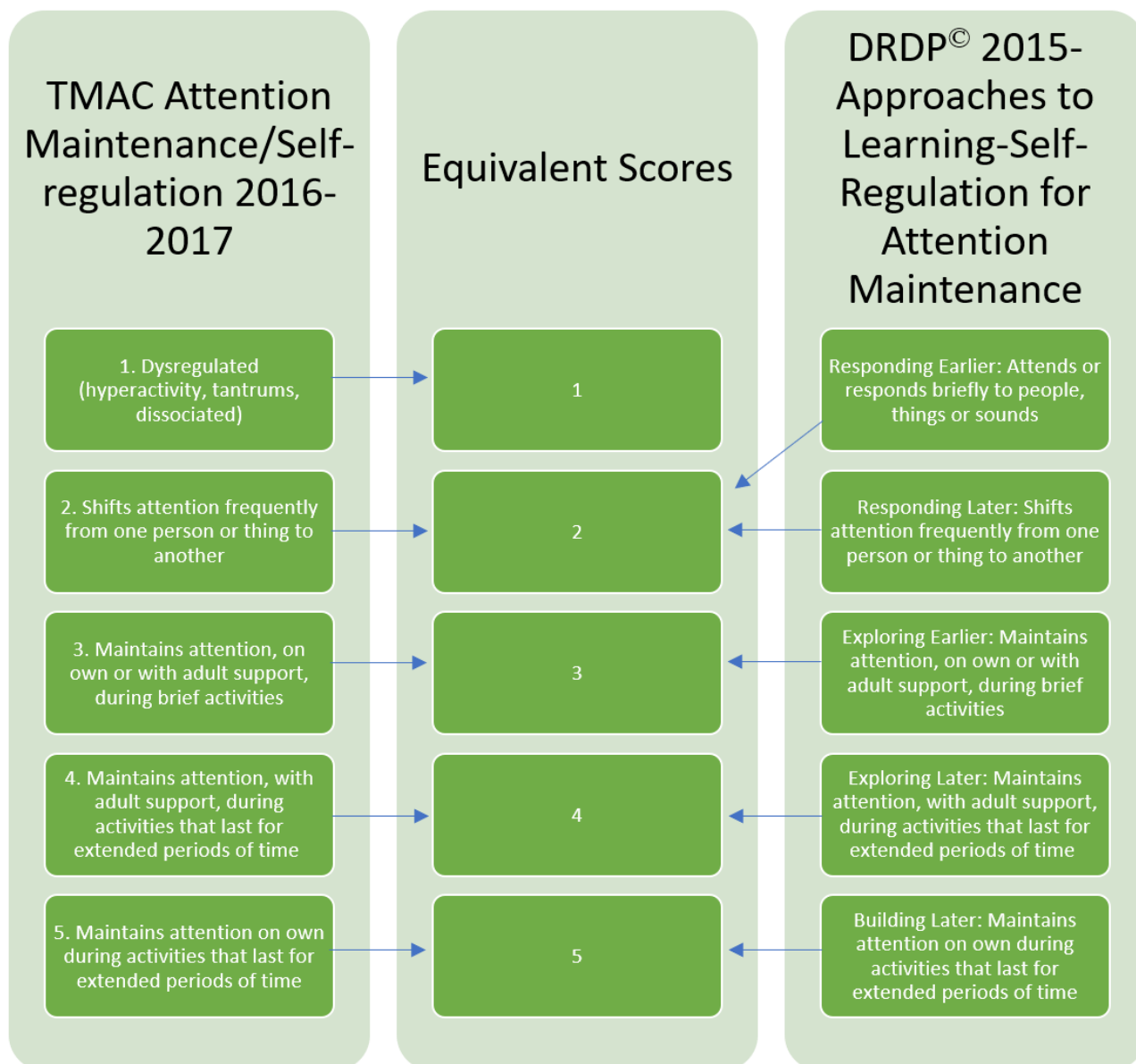


Figure 3. TMAC and DRDP® Attention Maintenance/Self-regulation Conversion Scale 2016-2017

DRDP® 2015 (California Department of Education, 2015)

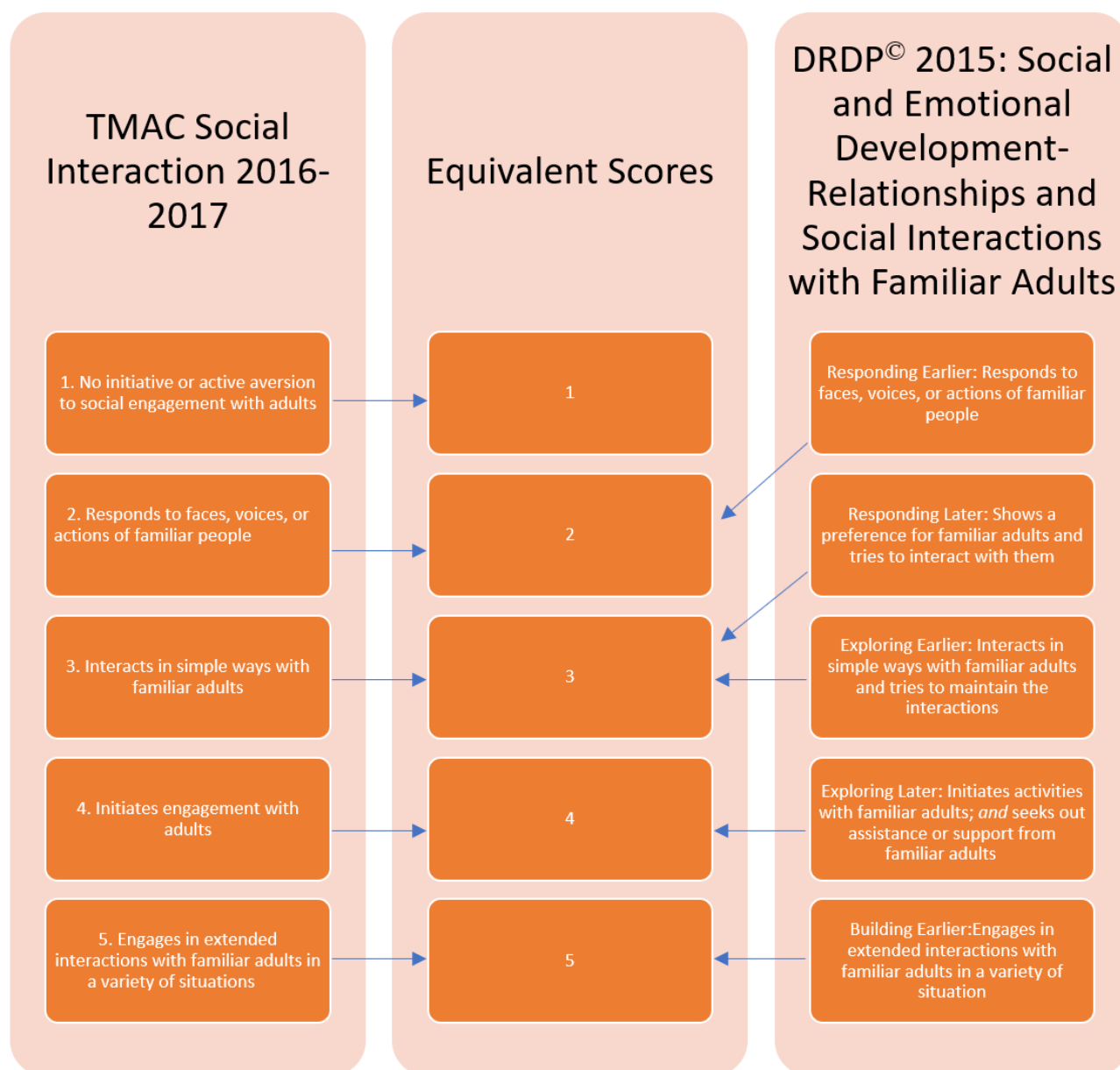


Figure 4. TMAC and DRDP® Social Interaction Conversion Scale 2016-2017
DRDP® 2015 (California Department of Education, 2015)

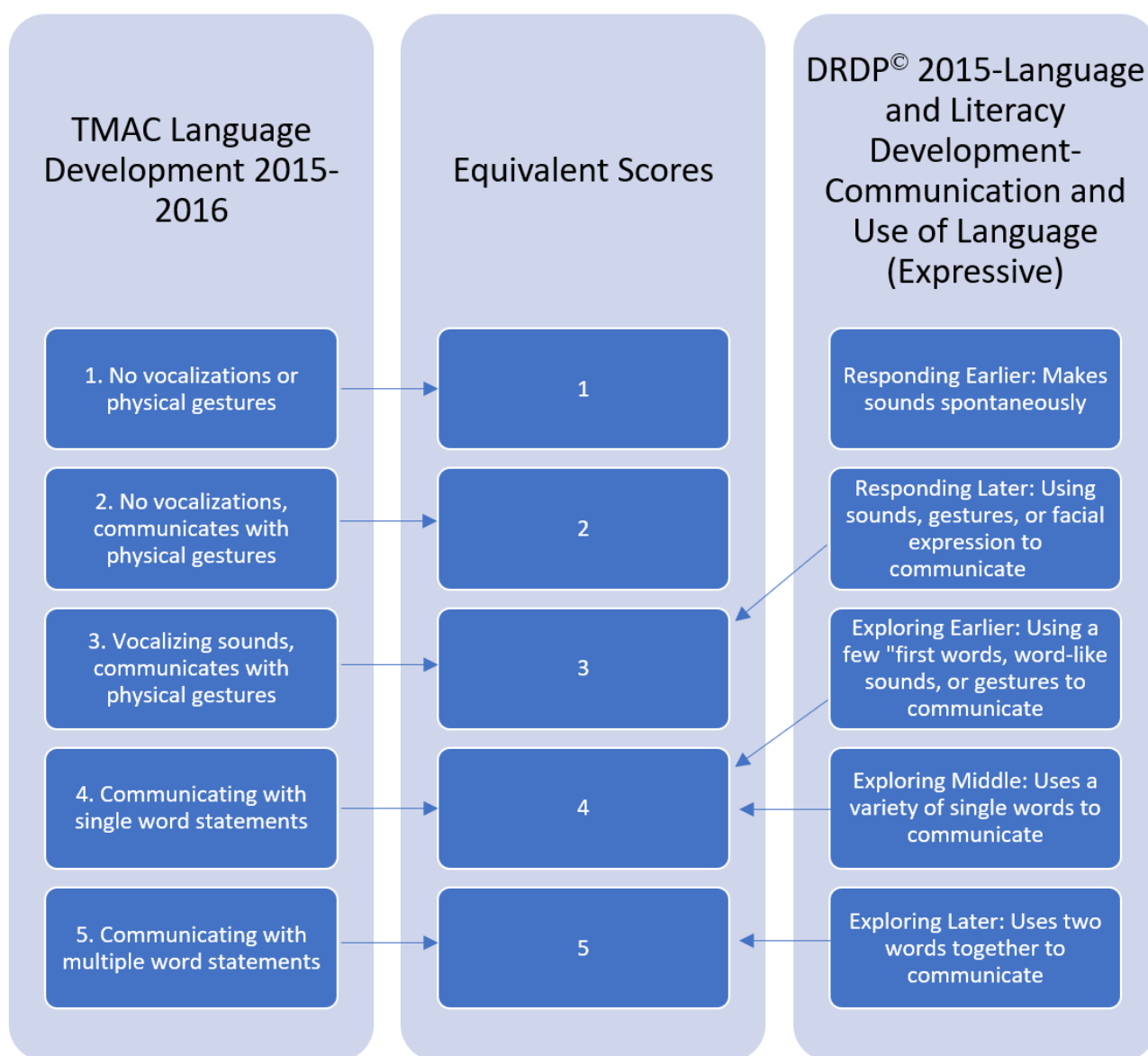


Figure 5. TMAC and DRDP® Language Development Conversion Scale 2015-2016
 DRDP® 2015 (California Department of Education, 2015)

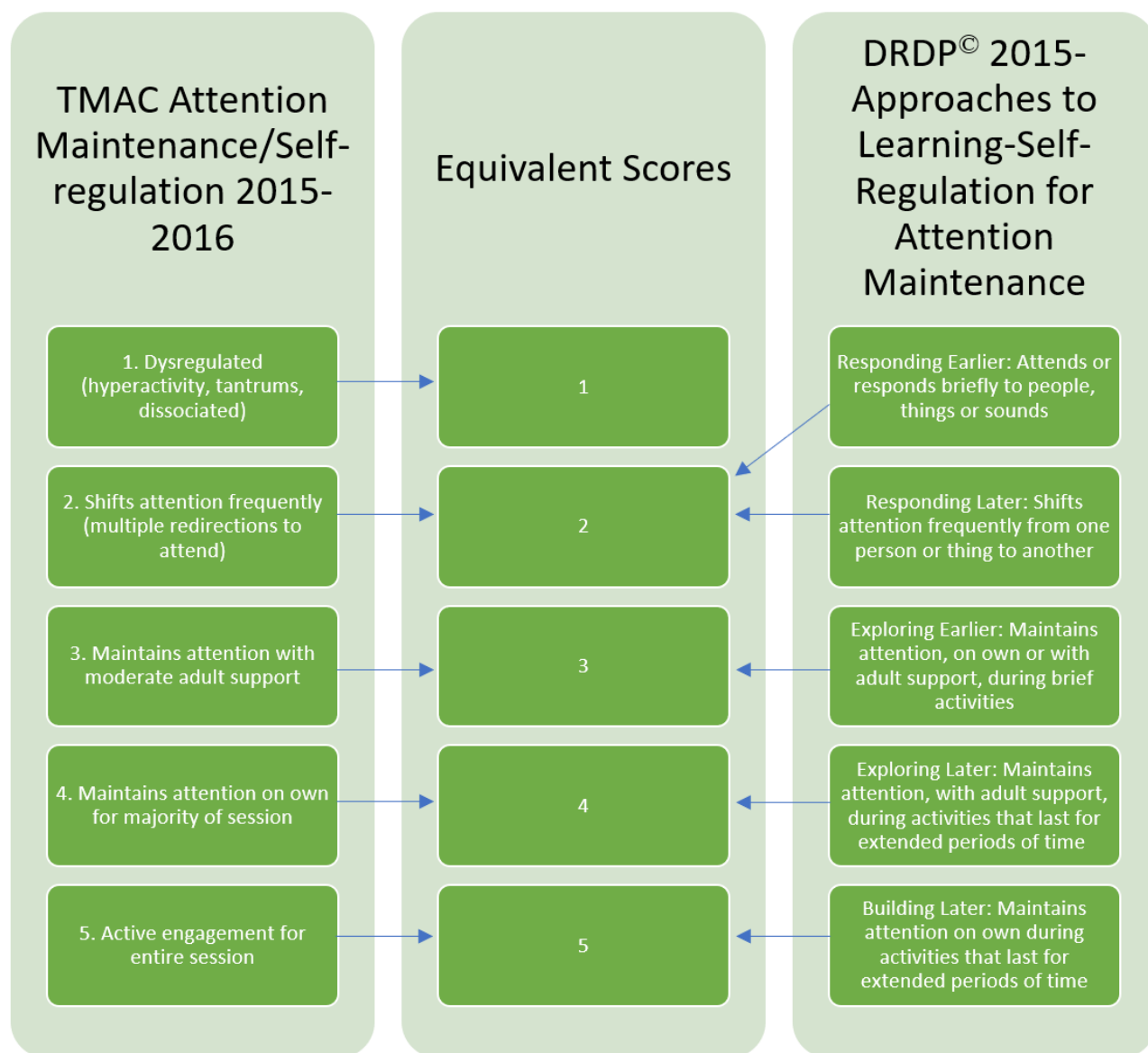


Figure 6. TMAC and DRDP® Attention Maintenance/Self-regulation Conversion Scale 2015-2016

DRDP® 2015 (California Department of Education, 2015)

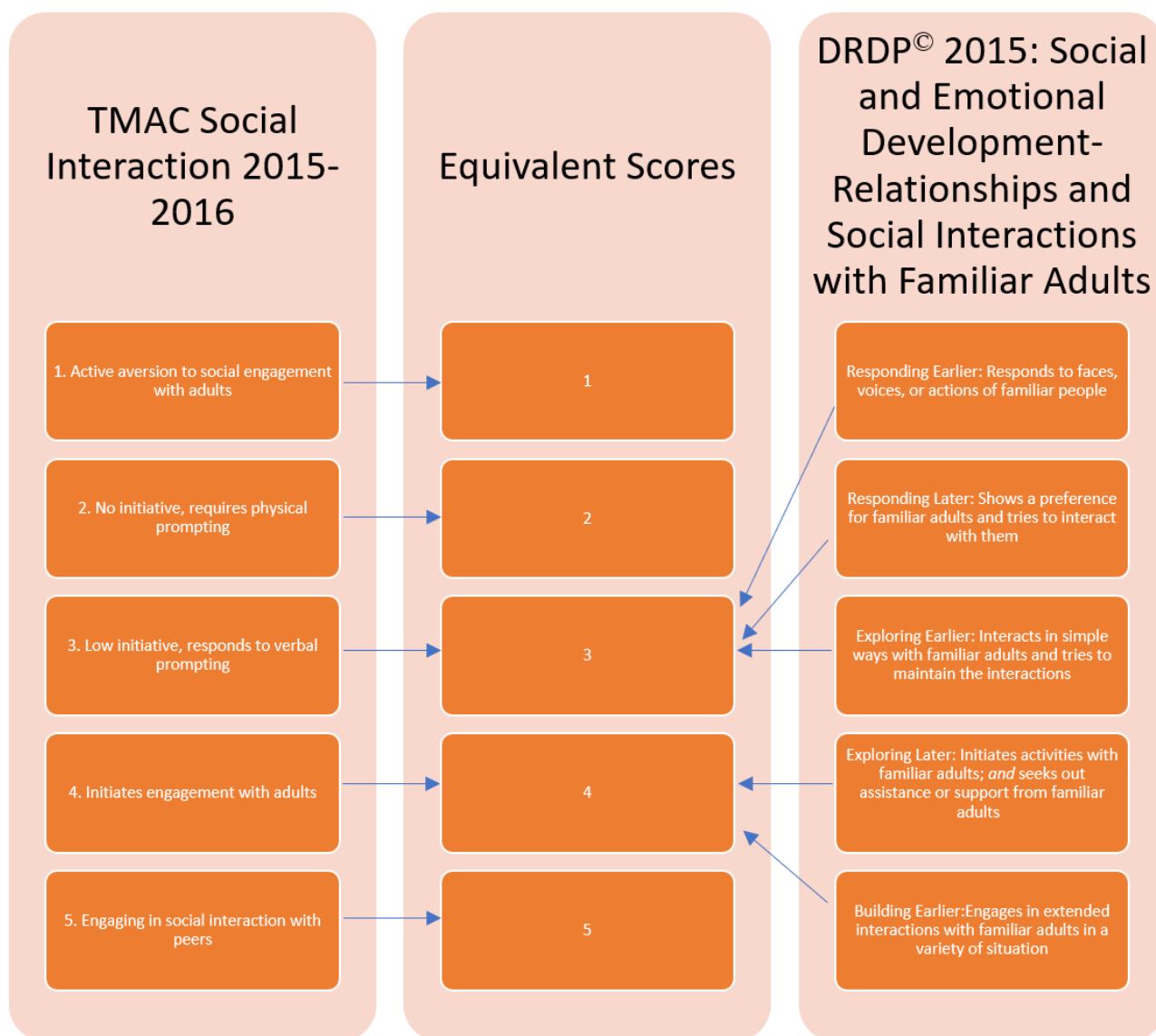


Figure 7. TMAC and DRDP[®] Social Interaction Conversion Scale 2015-2016
 DRDP[®] 2015 (California Department of Education, 2015)

Chapter 4: Integration of Conceptual Framework and Intervention

To evaluate the intervention, there are many pieces to review in relation to the current risk and protective factors and the potential influence on development identified in the literature, theoretical bases in Bronfenbrenner's systems theory, the consideration of humanism and Theraplay® in the intervention, and the essential elements of the intervention. This evaluation is done with a comparison of the intervention and its ability to address the areas of development, use attunement, use co-regulation, and Theraplay®. From this information, it is then possible to examine the intervention and discuss its potential effectiveness in addressing the needs of children and families living in poverty and identify how it could be improved.

First, there are many risk factors identified in the literature that can influence areas of development. Those identified in this paper include: punitive parenting, inconsistent parenting, maltreatment, neglect, early deprivation, parental mental health, parental age, increase in family size, marital discord and interpersonal violence, divorce, single parent households, absence of father, housing/disadvantaged neighborhood, no daycare, exposure to violence (domestic violence), and toxic stress. Earlier, the researcher made the connection between the risk factors and the areas of development they influence.

Second, the researcher identified the importance of Bronfenbrenner's systems theory. Interrelated systems can be linked to both risk and protective factors that influence the child's development. A child in poverty is influenced by so many risk factors that exist in the systems that directly influence the child daily, as well as those that indirectly influence the child. This connection is presented in Table 3 and as a graphic in Figure 8. If there is not a directly identified connection to one of the four developmental areas in the review of literature, this is marked with an "N/A".

Table 3

Risk Factors of Poverty and the Influence on the Child in the Context of Systems Theory

<u>Risk Factors</u>	<u>Areas of Development Effected</u>	<u>Systems Theory</u>
Punitive Parenting	Attachment Self-regulation Social Skills	Macrosystem
Inconsistent Parenting	N/A but influences mental health	Macrosystem
Maltreatment	Attachment Self-regulation Social Skills	Mesosystem
Neglect	Attachment Self-regulation	Mesosystem
Early Deprivation	Attachment Self-regulation	Microsystem
Parental Mental Health	Attachment Self-regulation Social Skills	Microsystem
Parental Age	N/A	Microsystem
Increase in Family	N/A	Microsystem
Marital Discord and Interpersonal Violence	Self-regulation Social Skills Language Development	Mesosystem
Divorce	Self-regulation Social Skills Language Development	Mesosystem
Single Parent Household	N/A	Microsystem
Absence of Father	Attachment	Microsystem

Table 3

Risk Factors of Poverty and the Influence on the Child in the Context of Systems Theory

<u>Risk Factors</u>	<u>Areas of Development Effected</u>	<u>Systems Theory</u>
Housing/Disadvantaged Neighborhood	Self-regulation	Microsystem
No Daycare	Language Development	Microsystem
Exposure to Violence (Domestic Violence)	Self-regulation Social Skills	Microsystem
Toxic Stress	Self-regulation Social Skills Language Development	Microsystem

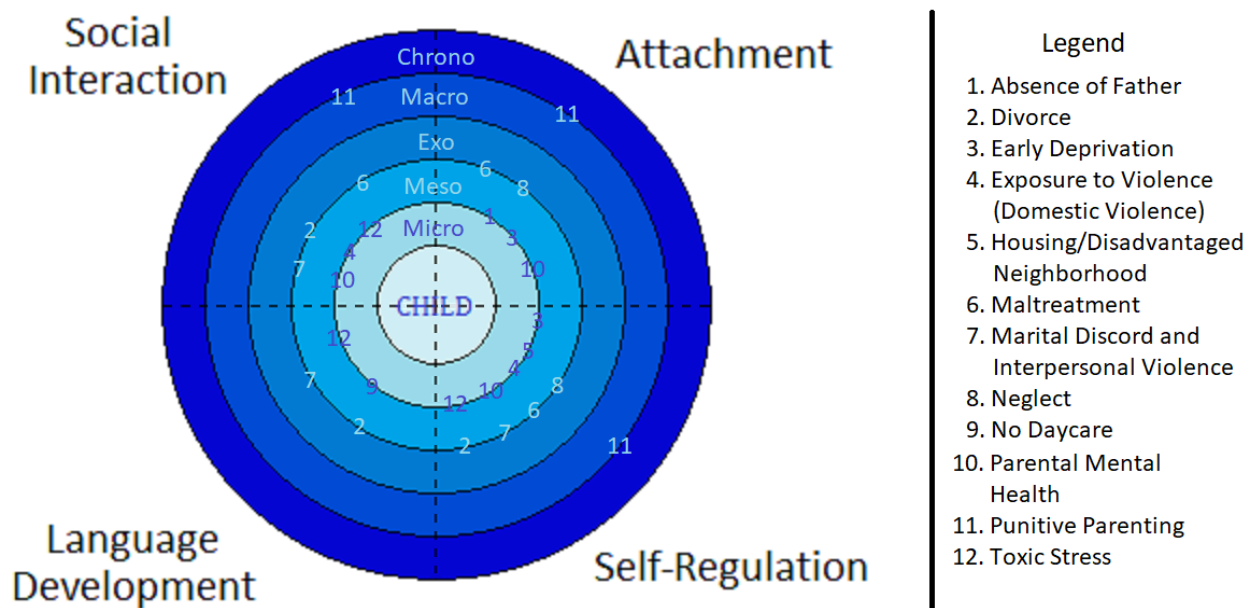


Figure 8. Risk Factors with Systems Theory Assessment

As is clear in Table 3 and Figure 8 above, many of the risk factors that directly influence the child and specific developmental areas are the ones that directly surround the child in their environment every day, or the microsystem and mesosystem. While there are other factors that have not been directly discussed in the research literature, these also influence the child and the systems closer to the child, as the larger systems can indirectly influence the child's development.

Third, the theoretical foundations of the intervention relate to each other to support the essential elements of the intervention. The combination of Bronfenbrenner's systems theory as a foundation of theory, the philosophical orientation of humanism, the Theraplay[®] dimensions, and the essential elements of attunement and co-regulation build a solid foundation for an intervention design. In identifying these connections, the intervention can become the protective factor that fosters the developmental areas of self-regulation, language, and social skills as key components to lifelong health and well-being. This would then contribute to the prevention of long-term negative outcomes of the many cumulative risk factors that are occurring during a pivotal time in development due to low income or poverty. The researcher created a chart to help understand the connections in the process of building the conceptual framework. This process and connections between these intervention foundations can be seen in the appendix.

Integration of the theoretical foundation with the existing design of the TMAC intervention allows for a better understanding of what the key components of the intervention are in addressing the needs of the population. This integration led the researcher to developing a conceptual framework to represent the needs of the child and how the intervention ideally addresses those needs. In the process of developing the conceptual framework and integrating it with the TMAC intervention, it is important to note that the intervention existed first, and the

conceptual framework was developed based on an extensive review of the literature regarding the population. The development of the conceptual framework was done for two reasons; first, in order to evaluate the theoretical validity of the intervention, and second, to give the researcher a deeper understanding of the intervention. A strong theoretical framework as a foundation of an intervention prepares the intervention for further study and may increase its efficacy. Also, the researcher is currently one of the primary therapists implementing the intervention at the ICCDC and the intervention developers are no longer providing music therapy services at the facility. Therefore, a clearly articulated theoretical framework makes for stronger translation to practice for multiple interventionists and provides an opportunity to evaluate and refine the intervention.

The conceptual framework illustrates the complexities of this population, allowing for a deeper understanding of: (a) all the risk and protective factors and their complexities, (b) appropriate and evidence-based interventions, (c) characteristics of resilience, and (d) theoretical models that influence the approach of preventive music therapy. The framework focuses on the context of early intervention for children living in poverty and complex trauma. The researcher started to develop this conceptual framework by thinking about the most prevalent needs of the population and the most important characteristics of the intervention that address those needs (illustrated in Figure 9, see pg. 94). The first step was to look at the development of the population. As there are so many ecological factors that influence the child, the researcher thought it necessary to recognize their value, as well as their influence on the intervention within the conceptual framework (Figure 9); the systems are illustrated as ice cream scoops that represent the whole “child.” Each scoop of ice cream represents a different system from Bronfenbrenner’s systems theory. As the scoops “melt,” it is representative of how the systems are all interactive and the influences or risks “trickle down” to the child.

The next important factor was that every child has a variety of risk and protective factors. There are so many factors that cannot be addressed therapeutically but influence the child, so the risk factors became the toppings in each system or scoop of ice cream. The toppings and extra ingredients, such as chocolate chips, became representative of the risk factors for the child. When you get too many toppings, it starts to ruin the essence of the ice cream and taste bad, in the same way that too many risk factors greatly influence the child's life and outcomes in a negative way. Risk factors identified in the theoretical framework within each system include: punitive parenting, inconsistent parenting, maltreatment, neglect, early deprivation, parental mental health, parental age, increase in family size, marital discord and interpersonal violence, divorce, single parent households, absence of father, housing/disadvantaged neighborhood, no daycare, exposure to violence (domestic violence), and toxic stress.

Next, the researcher identified how the intervention supports the most prevalent needs of children living in poverty and what are the most essential elements of the intervention. TMAC addresses the child's developmental areas that can be therapeutically addressed. These developmental areas include self-regulation, language development, and social skills. The researcher decided with one of the intervention developers that the intervention elements essential to addressing these areas are attunement and co-regulation, both through the therapist and music. The intervention should also represent a humanistic perspective of the whole child. Therefore, the TMAC intervention became the waffle cone to support the child, and with this support, healthy self-regulation, language development, and social skills can be the outcomes. The pattern of the waffle cone represents the intertwining of the important factors in this preventive intervention, the meeting of music and therapist using attunement and co-regulation to build healthy relationships and eventually self-regulation. The cone protects the ice cream

from falling, which is representative of increasing protective factors and building resiliency. In the end, the child is the full picture, including the ice cream and the cone. More importantly, is that every child is a different completed ice cream cone, because every child is individual with unique characteristics and circumstances. This representation can be seen in Figure 9.

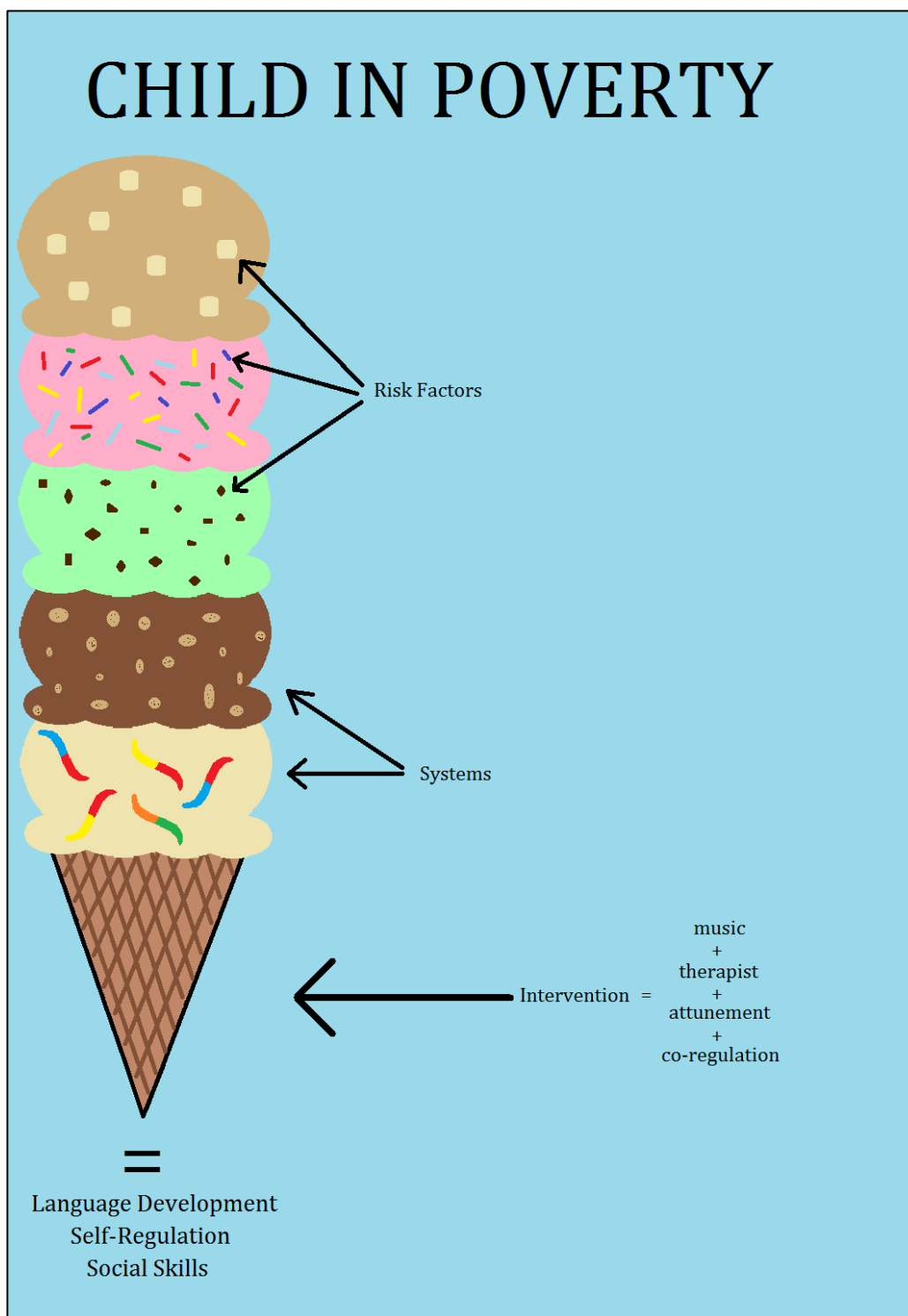


Figure 9. TMAC Conceptual Framework: TMAC conceptual framework based on protective and risk factors, systems theory, attachment, humanism, and preventive music therapy.

Now that there is a clear understanding of the theoretical basis, conceptual framework, and current TMAC intervention at the ICCDC, the next step is to evaluate whether the intervention is designed to fit the identified needs within the research and conceptual framework. Recalling from the literature presented in Chapter Two, the most commonly identified needs of this population are healthy relationships to help build attachment, self-regulation, language development, and social skills. Attachment can be facilitated through attunement and co-regulation. The TMAC intervention directly addresses each of these areas throughout the session. The researcher has chosen to display these connections in Table 4, so that the reader can see how the intervention addresses the areas of the theoretical constructs.

Table 4					
<i>Evaluation of TMAC against the Theoretical Constructs</i>					
<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Rules Song <ul style="list-style-type: none"> • Social Skills-eye contact and hand touches • Gestures • Assess energy level and regulatory behaviors 	Music Characteristics-Lyrics, Dynamics	Set limit and match energy level of class when they start session that day.	Presents opportunity to engage and interact with adult.	Structure Nurture Engage	Cognitive Self-regulation Behavioral Self-regulation Social skills
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, greeting child, identifying positive behaviors	Assess child's behaviors that day and reflect to child those that stand out.	Presents opportunity to engage and interact with adult.	Structure Nurture Engage	Cognitive Self-regulation Behavioral Self-regulation Social skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Hello Song <ul style="list-style-type: none"> • Social Skills-eye contact, initiate interactions with MT • Acknowledge peers 	Music Characteristics- Lyrics, Instrumentation, Dynamics	Match dynamics of music to child's affect or energy. Match lyrics to identified name of child if they choose a different name that day. One name per verse, so provides child with one-on-one attention within group.	Opportunity to choose whether they want to sing hello or not.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language Social skills
	Therapist Effectiveness-eye contact, affect, reflect, validate, greeting child, identifying positive behaviors	Assess child's behaviors that day and reflect to child those that stand out. Provides one-on-one opportunity to interact with MT.	Opportunity to use high energy in a safe space and direct child to transition back to sitting in a calm space.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language Social skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Transition Song <ul style="list-style-type: none"> Initiate interactions with adult through eye contact and/or hand touches 	Music Characteristics- Lyrics	Creates a playful opportunity to engage with MT.	Guiding child in social interaction.	Structure Engage	Cognitive Self-regulation Behavioral Self-regulation Social Skills
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, identifying positive behaviors	Acknowledge individual positive behaviors.	Sharing eye contact, smiles, and hand touches. Identifying different behaviors.	Nurture Engage	Cognitive Self-regulation Behavioral Self-regulation Social Skills
Lotion <ul style="list-style-type: none"> Initiate interactions with MT Verbalizations Identifying needs and wants Lower energy level Accept Nurture 	N/A				
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate	Following child's direction and helping child identify wants. Let child identify types of lotion and slips they want that day.	Do lotion slips together and interact one-on-one.	Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Language Social skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Modular Component #1 <ul style="list-style-type: none"> • Ability to follow energy modulation • Mirroring actions • Verbalizations 	Music Characteristics- Lyrics, Dynamics, Tempo, Instrumentation	Matching dynamics and tempo to the energy and regulation abilities of the class that day. Matching gestures and lyrics to ideas presented by children.	Providing opportunities to practice energy modulation with an adult in a safe space.	Structure Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language Social skills
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, identifying positive behaviors and recognizing individuals, following energy levels and regulatory levels of children	Following behaviors, energy levels, gestures, and ideas of child in the moment. Identifying positive behaviors and validating and reflecting in the moment.	Providing opportunities to practice potentially emotionally arousing situations with an adult in a safe space.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language Social skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Transition Song <ul style="list-style-type: none"> Follow direction Ability to practice transition 	Music Characteristics- Lyrics	Providing an engaging opportunity for a behavior that can be difficult.	Practicing ending a component and starting a new component. Practicing transition.	Structure Engage	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate	Assessing who is struggling with the transition and reflecting and validating for the child.	Validating and reflecting when children struggle with transitions. Setting a limit.	Structure Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Modular Component #2 <ul style="list-style-type: none"> Ability to follow energy modulation Mirroring actions Verbalizations Ability to wait for turn 	Music Characteristics- Lyrics, Dynamics, Tempo	Matching dynamics and tempo to the energy and regulation abilities of the class that day. Matching gestures and lyrics to ideas presented by children. Validating when children are waiting.	Providing opportunities to practice energy modulation with an adult in a safe space. Assisting children in waiting for a turn.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, identifying positive behaviors and recognizing individuals, following energy levels and regulatory levels of children	Following behaviors, energy levels, gestures, and ideas of child in the moment. Identifying positive behaviors and validating and reflecting in the moment.	Providing opportunities to practice potentially emotionally arousing situations with an adult in a safe space.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation Language

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Transition Song <ul style="list-style-type: none"> Follow directions Positive interactions with peers 	Music Characteristics- Lyrics	Providing an engaging opportunity for a behavior that can be difficult.	Practicing ending a component and starting a new component. Practicing transition.	Structure Engage	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate	Assessing who is struggling with the transition and reflecting and validating for the child.	Validating and reflecting when children struggle with transitions. Setting a limit.	Structure Challenge	Cognitive Self-regulation Emotional Self-regulation Behavioral Self-regulation
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Stretchy Band Component <ul style="list-style-type: none"> Verbalize Follow decrease in energy Mirror actions Sharing band with peers 	Music Characteristics- Lyrics, Dynamics	Bringing the dynamics down to decrease energy level. Using a familiar song to engage and provide nurture to the child.		Structure Nurture Engage	Cognitive Self-regulation Behavioral Self-regulation Language Social skills
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, greeting child	Following behaviors, energy levels, gestures, and ideas of child in the moment. Identifying positive behaviors and validating and reflecting in the moment.	Complete actions together. Validating and reflecting when children struggle with transitions. Setting a limit	Structure Nurture Engage Challenge	Cognitive Self-regulation Behavioral Self-regulation Language Social skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Transition Song <ul style="list-style-type: none"> • Ability to follow decrease in energy • Verbalizations • Mirroring gestures 	Music Characteristics- Lyrics, Dynamics	Providing an engaging opportunity for a behavior that can be difficult. Using softer dynamics to bring the energy level down.	Practicing ending a component and starting a new component. Practicing transition.	Structure Nurture Engage	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, identifying positive behaviors	Assessing who is struggling with the transition and reflecting and validating for the child.	Validating and reflecting when children struggle with transitions. Setting a limit.	Structure Challenge	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation
Fish and Feed <ul style="list-style-type: none"> • Eye tracking • Verbalizations • Initiate interactions with adult • Accept nurture 	N/A				
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate	Following child's direction and helping child identify wants. Providing nurturing interactions.	Feed child fish and provide opportunity for one-on-one.	Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation Language Development Social Skills

Table 4

Evaluation of TMAC against the Theoretical Constructs

<u>TMAC</u>		<u>THEORETICAL CONSTRUCTS</u>			
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Goodbye Song <ul style="list-style-type: none"> • Gestures • Verbalize • Sitting in spot 	Music Characteristics- Lyrics, Dynamics	Bringing dynamics down to bring group to lower energy level.		Structure Engage Nurture	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation Language Development Social Skills
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, saying goodbye to child	Speaking softly and verbalizing that it is time to sing goodbye. Assessing who is struggling with the transition and reflecting and validating for the child.	Validating and reflecting when children struggle with transitions. Setting a limit	Engage Nurture	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation Language Development Social Skills
Component & Target Behaviors	Component Description	Attunement	Co-regulation	Theraplay® Dimensions	Developmental Expectations
Hand Stamps <ul style="list-style-type: none"> • Initiate interactions with adult • Verbalize or gesture goodbye 	N/A				
	Therapist Effectiveness Behaviors-eye contact, affect, reflect, validate, saying goodbye to child	Following child's direction and helping child identify wants. Let child identify types of stamps they want that day. Assessing who is struggling with the transition and reflecting and validating for the child.	Do stamps together and interact one-on-one. Validating and reflecting when children struggle with transitions. Setting a limit.	Structure Nurture Engage Challenge	Cognitive Self-regulation Emotional Self-Regulation Behavioral Self-Regulation Language Development Social Skills

In looking at Table 4, it is easy to see that the TMAC intervention does in fact address many of the theoretical constructs, making the intervention a stronger intervention to use. Several developmental expectations and Theraplay® dimensions are addressed in each component through therapist effectiveness and music characteristics. There are also many opportunities for the therapist to use attunement and co-regulation in each component, which as discussed in the research literature, are key characteristics in addressing the building of healthy relationships and attachments and self-regulation. However, an important missing component is the lack of consideration for moderators.

Moderators

In research, moderators are variables that can influence the strength of the relationship between the independent and dependent variable. During this intervention, there are several moderators that can influence the effectiveness of the intervention and for which the interventionist should be aware. Moderators are important to consider in this case, as they can influence the strength of the relationship between the TMAC intervention and the outcomes.

There are several moderators present with children and families living in poverty and within the facility that are difficult to address and place many barriers when evaluating the effectiveness of treatment. These moderators include risk and protective factors, services, dosage, and classroom factors. First, each risk and protective factor that is present in the child and the systems surrounding the child are moderators. The intervention does not directly address risk factors outside of the microsystem and even then, the intervention addresses the influence of these risk factors rather than the risk factor directly.

In addition, many services are offered at this ICCDC, making it difficult to narrow down what exactly causes change. These services currently include play therapy, behavior intervention

support, and infant Theraplay®. Most infants receive Theraplay® for approximately 7-10 weeks, 1-2 times a year in the classroom with a child therapist and teachers present. These sessions are approximately 30 minutes long and have the teachers from the classroom and sometimes an adult to child ratio of 1:1 or 1:2. This service focuses on the dimensions of Theraplay®, using structure, engagement, nurture, and challenge to help the infants develop healthy attachment relationships and assist development. Infant Theraplay® at this ICCDC is similar to TMAC, but the interventions often look different in an effort to be developmentally appropriate for infants, sometimes with less music, and a higher adult to child ratio.

Some preschool children receive social-emotional group services with the behavior intervention specialist in small groups and a teacher from the classroom. These groups cover content on social skills, emotion identification, emotional regulation, and what to do when experiencing more intense emotions. These groups occur one to two times per week for several weeks, with a range of three to eight children from the classroom at a time for 20-30 minutes.

Another moderator is individual services, which are provided at the facility for some students that are receiving or have received TMAC. There are several children that receive individual play therapy with a child therapist or individual music therapy with a board-certified music therapist. In this setting, children usually have trauma history in the family or have experienced a form of abuse; however, this is not necessary to be referred for such individual services. Typically, play therapy sessions use nondirective play therapy, but based on the needs of the child, could also be individual Theraplay®. These sessions allow the child to express and experience emotions through play, as the child is comfortable. Individual TMAC focuses on providing more individualized support in building healthy attachment relationships and creating a safe place for the child to also experience and process emotions. Many aspects of

individualized components are the same as TMAC components, but individual sessions are client-directed, in that the therapist explicitly follows the child's choices. In addition, individual sessions use improvisation on various instruments and remove the transitions of the TMAC intervention. The individualized interventions still use structure, nurture, challenge, and engagement as a framework and provide the space for children to experience and learn emotions through these dimensions.

Another moderator present with all of these services, including TMAC, is dosage. Each child has received different amounts of each service, making it difficult to know how long services need to be provided to effect change. For example, within the current TMAC intervention, a child could have anywhere from zero to more than ninety TMAC sessions within one year.

There are several other moderators as well when looking at effectiveness of services. For example, each child has different risk and protective factors in place. Similarly, parent attunement at home and teacher attunement at the ICCDC are both very important moderators as these key caregivers and more consistent contact can have a lot of influence on outcomes. If a child is receiving the Theraplay® dimensions of structure, nurture, engagement, and challenge through attunement from the music therapist only in the two, thirty-minute sessions a week, the majority of the child's time is spent elsewhere. Therefore, with the needs of children living in poverty, it is extremely important that children are receiving attuned structure, nurture, engagement, and challenge in the classroom and at home as well to continue to learn to build healthy attachments and relationships and develop self-regulation, language, and social skills. The individual music therapist is also a moderator, including all aspects of affect, attunement,

validating and reflecting skills, effectiveness, musicianship, state of relationships between the music therapist and teacher, and choice of modular components.

There are also several moderators in the classroom. For example, there are frequently a lot of adults in the classroom with just eight children when there are volunteers, visitors, and teachers, as well as the music therapist. This makes it increasingly more difficult for the child to engage and build relationships with the primary teachers and music therapist, who are the focus of the TMAC group. In addition, the environment of the classroom presents several challenges, including interruptions from other people outside of the classroom, what toys and objects are near the session area, when teachers have release times and comfort breaks, and what rules the teacher puts in place in the classroom. Finally, there is always the moderator of the time of day and the day of the week. Based on clinical experience, groups with toddlers are more successful in the morning, as toddlers are waking up from nap in the afternoon, influencing engagement, and attendance is lower as children get picked up from the ICCDC.

Summary

First, the therapist is attuned to the needs of the child, with this being the primary focus of the session. While leading the session, the music therapist uses the necessary skills of matching affect, reflecting, validating, and helping the child explore through music. In addition, the intent is to help the teachers do the same inside and outside of session. These skills directly connect to the theory of the intervention in systems theory, humanism, attachment and attunement, and Theraplay®. The TMAC intervention focuses on the relationships between the child and music therapist and teachers, which is the same as humanism's focus on the relationship in therapy. In the same way, this intervention design requires the music therapist to use attunement to help the child experience healthy relationships and develop potential

attachments. The therapist's use of attunement is also the same as the concept of nurture in Theraplay®, so this intervention compliments Theraplay®, the model adopted by the ICCDC. Finally, the intervention helps children build relationships with the teachers and facilitates teachers' attunement in the classroom, therefore addressing more than just one system.

Furthermore, language is used through the session in a variety of TMAC components, whether it is through lyrics or in the many interactions between the child and music therapist or teacher. As all of the components have lyrics that direct the children, almost all the components are also addressing the dimension of structure in Theraplay®. While addressing language, this is also addressing the building of healthy relationships as some form of communication is necessary in relationships.

Self-regulation is addressed through the modular components, as the children are able to practice low and high arousal or energy levels. In addition, attention maintenance is a part of every component, meaning TMAC addresses self-regulation throughout the session. As the classes need modifications within the intervention, self-regulation is addressed in different ways, addressing different theoretical pieces. When a class struggles and has lower regulation, the therapist typically uses more nurturing components, meeting the nurturing dimension of Theraplay®. In addition, when a class has high regulation, the music therapist frequently introduces more challenge throughout the session to address the child's developmental needs. This change meets another Theraplay® dimension, challenge.

Much in the same way that the TMAC intervention addresses attachment and healthy relationships, the intervention also addresses social skills. There are several opportunities for the child to interact with the music therapist throughout the session, including Rules song, Hello song, Lotion Time Transition, Lotion Time, Stretchy Band, Fish and Feed, and the Hand Stamp

Transition. The child can also initiate interactions at any point in the session. This focus is also related to the concept of humanism and the importance of relationships, as well as engagement in Theraplay®.

When thinking about how the TMAC intervention matches the conceptual framework, the ice cream cone conceptual framework takes all the theoretical pieces as well as the intervention and puts it in one place. The intervention directly addresses the child as a whole, which is the ice cream cone, using therapist and music attunement. This allows the child to practice co-regulating with an adult and eventually developing self-regulation. This conceptual framework takes the TMAC intervention and factors it in as the cause of change in the areas of self-regulation, language, and social skills.

The systems theory conceptual framework was also based on the identified needs of the population. The researcher repeatedly found the same four areas of attachment, self-regulation, language development, and social skills; at the same time, the researcher noticed that a lot of the risk factors were factors that could not be controlled. Through this process, the researcher identified which risk factors commonly fit in which system and realized this could be helpful for individual children to then identify the highest need for each child (See Figure 8, pg. 89).

If individual needs could be identified with the systems theory conceptual framework, then the intervention could address the highest need of the child that is identified in the chart. However, this approach is not currently possible at the ICCDC; therefore, the intervention addresses the needs identified within this conceptual framework, but not necessarily on an individual basis. The TMAC does not address factors outside of the microsystem and mesosystem, and actually addresses very little of the mesosystem. To better address this framework, the intervention would need to address the parental factors as well.

In summary, the intervention directly reflects the conceptual framework. The ice cream cone conceptual framework was developed based on the intervention that is in place at the ICCDC in the context of the many risk and protective factors that are present in the lives of children living in poverty. The intervention addresses the common areas of need including healthy relationships, self-regulation, language development, and social skills. For now, the TMAC intervention focuses on the child, or the “ice cream cone.” This presents a point of contention regarding the overall identified needs of the population and intervention theory.

The greatest hurdle in using the systems theory risk conceptual framework as an assessment to better tailor the intervention is that the music therapist does not know all of the risk and protective factors on an individual basis. Therefore, in its current state, the TMAC intervention cannot fit this as an assessment. If the systems theory conceptual framework (Figure 1, pg. 63) were to be used as an assessment for TMAC, the intervention would still have the limitation of addressing only the immediate system around the child, the microsystem, without addressing the factors in the other systems. Ideally, the microsystem and mesosystem would be addressed with intervention for both the child and the parent. The most important area identified in research that the intervention does not directly address is the multigenerational approach within music therapy. While the intervention addresses the child and other interventions at the ICCDC work with the adults, music therapy and TMAC specifically, do not directly address more than one generation, which may make this approach less effective with this population than if multigenerational intervention were used. The hope is that this could be more directly addressed in the future.

Chapter 5: Discussion

Congruence/Incongruence

In conclusion, the TMAC intervention is congruent with the theory as it was designed and built on the highest needs of the population identified in the literature. TMAC addresses the highest identified needs of children living in poverty, including attachment, self-regulation, language development, and social skills throughout the intervention. Attunement is a very important element, as it directly addresses attachment and social skills. The intervention uses the Theraplay® dimensions of nurture, engagement, structure, and challenge throughout to inform the components and allow the therapist to adjust to the needs of the child or class. The focus of the intervention is on healthy relationships, which is an important component of humanism and at the heart of building attachments with others.

There is one major point of incongruence, which is that the intervention addresses the risk factors of the child and is an intervention primarily for children; the current format does not address the primary caregiver. In other words, while the microsystem is addressed, the risk factors inherent in the mesosystem that also influence the child, are not directly addressed. While TMAC is inclusive of the teachers, this is not the same as an intervention integrating with the primary caregiver. Also, there is unintentional incongruence within the mesosystem when teachers are disengaged or not present in session, thus making that element of healthy relationship building unavailable. Multigenerational approaches were considered best practice in the literature, which would also address more of the child within systems theory. Additionally, risk factors in several systems surrounding the child are identified in the conceptual frameworks, but most of these cannot be addressed through a child-based group therapeutic intervention. These factors may best be addressed through advocacy and through support of the family, but not

through TMAC in its current design. The multigenerational component and some of the other risk factors are addressed through other services at the ICCDC, but even these may not be as family based as they could be. Therefore, TMAC addresses this issue as best able within a therapeutic intervention with children, but there are some changes that could make it even more congruent with the theoretical framework.

Revisions to Intervention

Moving forward, there are some potential revisions to TMAC that would be beneficial based on the developmental level of each classroom. First, it has already been established that two-year olds need to have a shorter session of twenty minutes. One of the revisions that would also adjust to where they are in development is removing the stretchy band component. It still functions in some classrooms, but younger classrooms do not have the fine motor skills or mirroring abilities to follow this component. This change decreases the session time, but can also be replaced with a different component that still addresses the same need. Each classroom is in a different place developmentally in each area of self-regulation, language development, and social skills, so there are changes that could be made based on these differences.

A potential revision would include a pre-determined structure indicating modifications of TMAC for high and low regulated classrooms. For example, when a classroom has high regulation, the music therapist typically adds a third modular intervention that addresses the same goal areas of self-regulation, language development, and social skills. This could be a permanent session structure for TMAC groups for a classroom with high regulation. In a classroom with lower regulation, the music therapist may either (a) adjust the structure of the session to start with higher energy to meet the children where they are at and then use lower, more nurturing components in the middle of the session, (b) just use the more nurturing

components in the session, or (c) may take out one of the modular components until the class is able to handle the single modular component several times. In addition, it is not uncommon for the music therapists to add some deep breathing transitions to a session if a group has low regulation, such as blowing out a candle by blowing in through the nose and out through the mouth. These contingent approaches could become a permanent session structure for TMAC groups for a classroom with high or low regulation. Each of these adaptations could have a title within TMAC and the music therapist could state which version of TMAC is used in documentation.

Another essential piece to the TMAC intervention that the researcher suggests, is that the music therapist be present in the classroom throughout the week, which allows for the music therapist to build relationships with the children outside of group as well. Two, thirty-minute sessions a week is not enough time to build the level of relationship with the children and teachers that is needed to make the intervention more effective, and therefore it is essential that the music therapist spend extra time in each classroom when possible. This could be at any point in the day, but it is often less disruptive during times when the children can interact with the music therapist, such as outside time or free play time. The researcher recommends this interaction because relationships with the teachers and children are not all built through only therapeutic processes. Going into the classroom during other times in the day allows the music therapist to talk with the teacher, offer support in the classroom, and meet the children's interests where they are at while they are playing outside, having free play inside, or during scheduled classroom activities. It helps the child to know that the music therapist is a person that is around and can be trusted.

Measurement Recommendations

In evaluating what is working and what needs to be adjusted, one of the biggest areas of need is the method and scales of measurement. As previously discussed, the TMAC measurement scales are aligned with another method of measure at the ICCDC, called the Desired Results Developmental Profile[®] (DRDP) (California Department of Education, 2015). The scale used in the TMAC measurement tool needs to be further broken down to more effectively measure the changes and improvements that occur in group music therapy sessions for each individual child and the group as a whole. For example, in language development, the scale states “Using word-like sounds, or gestures to communicate” is a score of three and “Uses a variety of single words to communicate” receives a score of a four. Here there is no clear way in which to score a child who is using only a couple of words, but would not qualify for a score of four because the word usage is not a variety of words. However, the child is further developed than word-like sounds or gestures, so a score of three would also underrepresent the child’s development. Nevertheless, this is a milestone of importance that needs to be measured in some way and should be accounted for in the intervention measurement tool.

Furthermore, in examining the areas of self-regulation that are addressed in the TMAC intervention, cognitive, behavioral, and emotional regulation are all addressed in some capacity. However, the current measurement scale only measures the attention maintenance, or cognitive self-regulation, of each child. If this scale could be adjusted to measure each type of self-regulation within developmental expectations, there would be a clearer scale of the changes in behavior.

While, the researcher agrees that taking data each session in the same areas of self-regulation, language development, and social skills would still be appropriate with this design of

measurement, the researcher suggests the scales should expand to a larger scale in each area that allows for only one behavior per score, providing clarity to what score should be given. In addition, the researcher believes that having the larger scale would also help include below average and above average skills in each area, allowing for more changes to be tracked. For example, the scale for social skills currently stops at engagement with adults, but sometimes the children engage with peers. This demonstration is above the current developmental expectation, but it is important to document that such a skill is occurring in sessions. This larger scale with above and below average skills could allow the music therapist to further adjust and modify sessions to the specific needs of the individuals in each classroom. The researcher believes that this could also help the music therapists to evaluate the effectiveness of TMAC and how it could be adjusted to be even more effective.

In addition, the music therapists complete a narrative field note each session that tracks each group's regulation and engagement. After utilizing this method, the researcher has created an alternative option that could be less repetitive and track common behaviors easily for each individual child. Each child would have a series of boxes labeled with typical behaviors that the music therapist is looking for during session. Each child receives a score based on how frequently this behavior occurs during session using a scale of never, occasionally, sometimes, and frequently. Each of these would be linked to a graph for each individual child to better see the common behaviors and needs across time. This would allow the music therapists at the ICCDC to better evaluate the needs of individuals and plan TMAC sessions to fit these needs.

Limitations

As is typical of any intervention when working with real people, there are limitations to the use of TMAC. The main limitation of TMAC is that the intervention is only implemented

with the toddlers, when in reality, many risk factors occur for the child in the systems surrounding the child. While a child may learn and develop healthy relationships within TMAC session, there are frequently different expectations in the home and classroom that do not provide the structure, nurture, engagement, and challenge that the children need. If the areas of need discussed throughout this research were addressed in the home and the classroom, the intervention would have the potential to be more effective with stronger outcomes. For example, classroom or home setting may set different limits than those during a therapeutic group. Inconsistency limits the capabilities of change within TMAC. An additional limitation is that services are only with the child, instead of addressing the whole family. This constrains the improvement that can be made, as the parent's mental health is a risk or protective factor for the child.

The other major limitation is the current ability to address moderators that occur during session. One challenge is to demonstrate healthy relationships with the children when teachers are not present or engaged in sessions. When teachers or other adults have conversations during TMAC sessions or do not participate, it distracts the child; therefore, the opportunity to attune and strengthen the relationship between the teacher and child is either compromised or lost. Also, when there are too many adults are present in a group, it restricts the possible engagement in session. Based on experience, the children often engage less and/or are distracted by the other adults in the room. This distraction keeps the toddlers from being able to work on healthy relationships with the music therapist and teachers in the classroom, which is an important piece of this intervention. Optimally, teachers would use attunement to nurture, engage, and challenge the children, while also singing or doing the actions with the music therapist. Therefore, this limits what is possible in a TMAC session.

A final limitation is the method of measurement. The current measurement is beneficial in that it lines up with another assessment that is used by teachers in the classroom. However, in this case, on a session-to-session basis, the assessment tool is not as discriminating as it needs to be to show the nuances of changes in behavior. Some scale scores include more than one behavior. This lack of specificity limits the ability to see the subtler changes within specific behaviors that occur in each child, as well as the development of new behaviors as they occur. This scale also does not include behaviors that are above common developmental levels, therefore, it does not show improvement beyond the expected score. Assessment would benefit if some above average behaviors were included. Therapists could then track what changes are happening and when on a greater set of continua. Being able to track these subtle nuances of change will allow the music therapists to better see the effectiveness of TMAC as well as allow the tracking of more behaviors as they develop.

Challenges of Implementation

There exist several challenges regarding the implementation of TMAC in this setting. The most challenging piece is the number of moderators that are present within TMAC groups, the children, and families. Prevalent moderators that specifically challenge implementation mostly include those that occur in the classroom, such as too many adults in the classroom and the environment of the classroom. The environment presents many challenges including (a) interruptions from other people outside of the classroom, (b) what toys and objects are near the session area, (c) when teachers have release times and comfort breaks, and (d) what rules the teacher puts in place in the classroom.

One solution to eliminate these moderators would be to have the children come to a specific music room for TMAC group sessions with just the teachers. The music therapist would

be able to set up and control the space and directions, which would be helpful in eliminating classroom interruptions, the overabundance of adults in the room at one time, and other moderators related to the teacher. For example, bathroom breaks and classroom preparation would not occur during sessions because teachers would be in another location. In addition, the music therapist could then better control smaller factors, such as where and how the children sit in the room. Distractions for the children could be minimized as their regular classroom toys are not near the location. A specific room might also provide a better learning opportunity for teachers in specific areas, including focusing on attuning to children's needs and setting limits that could carry to the classroom.

Recommendations for Future Clinical Use, Development, and Research

As this is a program of continuous evaluation and development, there are a few changes that would be beneficial to the program and that have been considered for future possibilities. One way TMAC could change is by integrating with a family model. There are many different directions this could develop, but as TMAC is designed now, it only addresses the needs of the child. One option would be for the music therapists to develop a program that serves the adults, while continuing to do TMAC with the children. Another possibility would be getting parents involved in TMAC groups, so that the children are able to build relationships with primary caregivers, while training primary caregivers to interact, play, and attune with their child. Currently, the music therapists are promoting as much as possible the option of primary caregivers participating in the individual music therapy services with their children. The goal is to address the whole family as much as possible to meet more systems, and address risk factors and needs of the population at the ICCDC simultaneously.

Another possible expansion would be to design versions to match development within the TMAC protocol. The intervention would have a clear protocol with typical modifications for a classroom that has low regulation and one for high regulation. For example, in classrooms where the children have high regulation, the researcher currently adds a third modular intervention to the TMAC intervention, so this would always be a part of the protocol for a classroom with high regulation. In a low regulation classroom, the use of the stretchy band is frequently taken out and replaced by another intervention. This would always be a part of the protocol for a classroom with low regulation. In this way, there would be a progression of TMAC protocols that would be used for a class with low regulation until reaching high regulation if possible.

The researcher has considered how data collection could be adapted to better measure the changes that are occurring in TMAC groups, but are not always indicated in the data. Currently, the TMAC measurement scales align with three of the DRDP[®] categories. While these categories are the appropriate areas to measure, the scales have some complications that make it difficult to see change. Therefore, the researcher recommends that a scale with the behaviors broken down into a larger scale with more discrete discrimination, possibly one to ten in each developmental area, would be beneficial. This scale would also include behaviors that are above and below the developmental expectation, so that improvement above the expectation can be shown while also demonstrating the needs of those children with more struggles. The researcher would also like to include clear definitions on these scales, so it is clear to someone looking at the scale for the first time what is being measured.

In addition, the music therapists currently complete a field note template developed for another intervention. An adaptation to the current version could be more beneficial to the ICCDC at this time. As the researcher used this tool, she discovered that she was repeating herself

frequently and that the changes occurring were not as clear as they could be. The researcher therefore suggests adjusting the top to have boxes labeled with the behaviors at the top for each child, and then each child would get a score in each box for each session. Each of these behaviors would be electronically tied to a graph for each child, so that the overall behavior patterns of the child can be observed. TMAC group session can then be adapted to fit the individual needs of the children within a group. There is still a section to elaborate on specific behaviors as necessary should they occur.

Furthermore, now that an intervention and clear protocol has been developed, there is the potential for further research. One possibility would be to do a secondary analysis of the data collected over the past couple of years, to see if (a) there is improvement in self-regulation, language development, and social skills during the time of TMAC group services and (b) if these children are more on track and ready for kindergarten with the DRDP[®] scores in the areas of self-regulation, language development, and social skills than the children that did not previously receive TMAC group services at the ICCDC. A secondary analysis would be helpful as it would provide a more longitudinal look at TMAC services. However, it may be more beneficial to revisit this idea once there is a stronger and clearer measurement tool. Another possibility would be to further develop the intervention to fit the needs of preschoolers so that they are also receiving TMAC services for continuity, as this age range of children continue to demonstrate very similar needs at the ICCDC. A final possibility would be a comparison of using the TMAC intervention with children living in poverty and typically developing children of the same age group to examine if the intervention fits the needs of other populations as well.

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Appendix

Developmental Domain: ATL-REG — Approaches to Learning–Self-Regulation

ATL-REG 1: Attention Maintenance

Child develops the capacity to pay attention to people, things, or the environment when interacting with others or exploring play materials

Mark the latest developmental level the child has mastered:

Responding		Exploring		Building			Integrating
Earlier ○	Later ○	Earlier ○	Later ○	Earlier ○	Middle	Later	Earlier
Attends or responds briefly to people, things, or sounds	Shifts attention frequently from one person or thing to another	Maintains attention, on own or with adult support, during brief activities	Maintains attention, with adult support, during activities that last for extended periods of time	Maintains attention on own during activities that last for extended periods of time	<i>There are no later levels for this measure</i>		
Possible Examples <ul style="list-style-type: none"> • Pays attention to a moving mobile. • Quiets to the voice of a familiar person. • Gazes at the smiling face of a familiar person. 	<ul style="list-style-type: none"> • Turns attention toward an interesting toy, then back to an adult or a child. • Actively shifts interest from one child to another playing close by. • Drops one thing in order to reach for another. 	<ul style="list-style-type: none"> • Briefly watches other children playing and then resumes play with a toy. • Resumes playing at sand table when an adult joins in digging. • Dumps toy animals from container, puts animals back in the container, and then dumps them out again. 	<ul style="list-style-type: none"> • Listens to a book from beginning to end and then gestures for an adult to read it a second time. • Starts working on a simple puzzle with an adult and continues when the adult steps away briefly. • Continues playing with toy cars, adding a bridge offered by an adult sitting nearby. 	<ul style="list-style-type: none"> • Makes a pile of pretend pancakes with play dough on own and then offers them to peers. • Builds multiple towers with interlocking blocks. • Looks through several books on own in library corner during the morning. • Listens to audio books while looking at enlarged pictures related to the story on a screen, on own, during the morning. 			

- Child is emerging to the next developmental level
 ○ Unable to rate this measure due to extended absence



ATL-REG 1

Attention Maintenance

ATL-REG 1

DRDP (2015): A Developmental Continuum from Early Infancy to Kindergarten Entry – Infant/Toddler View – August 1, 2015 © 2013-2015 California Department of Education – All rights reserved

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DRDP® 2015 Attention Maintenance Excerpt (California Department of Education, 2015)

Developmental Domain: LLD — Language and Literacy Development

LLD 3: Communication and Use of Language (Expressive)

Child's communication develops from nonverbal communication to using language with increasingly complex words and sentences

Mark the latest developmental level the child has mastered:

Responding		Exploring			Building			Integrating
Earlier ○	Later ○	Earlier ○	Middle ○	Later ○	Earlier ○	Middle N/A	Later N/A	Earlier N/A
Makes sounds spontaneously	Uses sounds, gestures, or facial expressions to communicate	Uses a few “first words,” word-like sounds, or gestures to communicate	Uses a variety of single words to communicate	Uses two words together to communicate	Uses short phrases or sentences of more than two words to communicate	Uses short sentences that contain nouns, verbs, and other words, such as adjectives and recently encountered vocabulary, to communicate	Uses phrases and sentences with a variety of word forms, including past tense, future tense, plurals, pronouns, or possessives, to communicate, sometimes with errors	Combines phrases and sentences with a variety of word forms to communicate ideas or to describe people, objects, or events
Possible Examples								
<ul style="list-style-type: none">• Cries.• Coos.• Gurgles.	<ul style="list-style-type: none">• Smiles when a familiar person approaches.• Cries or looks at an adult when hungry.• Vocalizes or babbles while interacting with an adult.	<ul style="list-style-type: none">• Asks for food when hungry, by using a special word, sound, or gesture for food.• Communicates, “Mama,” “Dada,” “Baba,” or similar word approximations.• Reaches for or gestures for an object.	<ul style="list-style-type: none">• Names familiar foods, toys, or family members.• Communicates ideas such as “No,” “More,” or “Up.”• Indicates a picture of a ball when asked what the child wants to play with next.	<ul style="list-style-type: none">• Communicates, “Mommy come,” when wanting a parent.• Communicates, “More juice,” when thirsty.• Communicates, “我的卡车!” [“My truck!” in Chinese] after another child takes a toy truck.	<ul style="list-style-type: none">• Communicates, “A mí me toca,” [“It’s my turn,” in Spanish] when an adult brings the pet rabbit for a visit.• Communicates, “I want mommy.”• Communicates, “I like dogs,” while looking at an animal book.	<ul style="list-style-type: none">• Communicates, “The rabbit is scared,” when the pet rabbit snuggles into an adult’s lap. [“Scared” is an adjective.]• Communicates using a communication board, “I need a tissue. My nose is runny.” [“Tissue” is a noun and “runny” is an adjective.]• Communicates, “Malaking malaki ang aso namin,” [“Our dog is huge,” in Tagalog] after hearing a peer use the word “huge.” [“Huge” is a recently encountered vocabulary word.]	<ul style="list-style-type: none">• Communicates to a peer, during play, “Yesterday we made vegetable soup.” [“We” is a pronoun; “made” is past tense.]• Communicates, “His birthday is tomorrow. He will be five.” [“His” is a possessive pronoun; “he” is a pronoun; “will be” is future tense.]• Communicates in sign language that the cat’s feet are wet. [“Cat’s” is possessive; “feet” is plural.]• Communicates, “He ran really fast.” [He ran really fast]. [“Ran” is past tense with a grammatical error.]	<ul style="list-style-type: none">• Communicates, “Dragons don’t need bikes ‘cause they can fly. They have really big wings.”• Communicates to a peer, “Let’s hurry and clean up so we can go outside to ride bikes.”• Communicates via spoken words, signs, or a communication device, “The dog ate the cat’s food, and then he got in trouble. We put him outside and he was very sad.”• Communicates, “Mi abuela es muy vieja. Tiene el cabello blanco y muchas arrugas.” [“My grandma is really old. She has white hair and lots of wrinkles,” in Spanish].

- Child is emerging to the next developmental level
 ○ Unable to rate this measure due to extended absence

**LLD 3****Communication and Use of Language (Expressive)****LLD 3**

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Developmental Domain: SED — Social and Emotional Development

SED 3: Relationships and Social Interactions with Familiar Adults

Child develops close relationships with one or more familiar adults (including family members) and interacts in an increasingly competent and cooperative manner with familiar adults

Mark the latest developmental level the child has mastered:

Responding		Exploring		Building			Integrating
Earlier ○	Later ○	Earlier ○	Later ○	Earlier ○	Middle N/A	Later N/A	Earlier N/A
Responds to faces, voices, or actions of familiar people	Shows a preference for familiar adults and tries to interact with them	Interacts in simple ways with familiar adults and tries to maintain the interactions	Initiates activities with familiar adults; and Seeks out assistance or support from familiar adults	Engages in extended interactions with familiar adults in a variety of situations (e.g., sharing ideas or experiences, solving simple problems)	Seeks a familiar adult's ideas or explanations about events or experiences that are interesting to the child	Takes initiative in creating cooperative activities with a familiar adult	Works cooperatively with familiar adults, over sustained periods, to plan and carry out activities or to solve problems
Possible Examples <ul style="list-style-type: none"> Widens eyes or brightens face at the face of a familiar adult. Orients toward a familiar adult's voice. Quiets when picked up by a familiar adult. 	<ul style="list-style-type: none"> Reaches for a familiar adult when being held by another adult. Vocalizes at a familiar adult to gain the adult's attention. Laughs in anticipation before a familiar adult nuzzles child's neck. 	<ul style="list-style-type: none"> Places toy on a familiar adult's lap, goes to get another toy, and then places that toy on the adult's lap. Puts hands near head to continue a game of peek-a-boo when a familiar adult pauses. Repeatedly hands little cars to a familiar adult to continue a joint activity. 	<ul style="list-style-type: none"> Grasps a familiar adult's hand to gain attention, and then gestures to begin a finger-play game. Communicates interest in looking at a book with a familiar adult. Brings a blanket to a familiar adult and then climbs into the adult's lap when upset. Gestures to a familiar adult for assistance about how to remove a tight lid from a canister. 	<ul style="list-style-type: none"> Communicates to a familiar adult, "Want some tea?" during a pretend tea party. Completes a simple puzzle with a familiar adult, taking turns to fit pieces. Shares rocks collected while playing outside with a familiar adult. Uses an electronic tablet to play a game with a familiar adult. 	<ul style="list-style-type: none"> Asks a teacher why another child is not going outside with the group. Communicates to an adult, "What's the bee doing?" while watching a bee fly from flower to flower or sharing a book together about bees. Asks a familiar adult for a suggestion about how to build the tower to keep it from falling down. 	<ul style="list-style-type: none"> Offers to place napkins and cups on the table when a familiar adult is preparing a snack. Brings a board game to a familiar adult and communicates an interest in playing together. Gives pretend food to a familiar adult and communicates, "I made some hamburgers for you. You tell me what you want to drink." 	<ul style="list-style-type: none"> Works together with a familiar adult to complete a puzzle over several days, organizing pieces in different ways. Plans a gardening activity with a familiar adult, communicating by signing the materials needed. Gathers possible construction materials, such as glue, paper, and scissors, from a supply shelf to contribute to a building project with a familiar adult. Works with a familiar adult and a group of children to make a piñata over two days, offering alternatives for its shape and construction and what will go inside.

- Child is emerging to the next developmental level
 ○ Unable to rate this measure due to extended absence

**SED 3****Relationships and Social Interactions with Familiar Adults****SED 3**

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DRDP® 2015 Social and Emotional Development Excerpt (California Department of Education, 2015)

Current TMAC Measurement Tool (B. Corey, personal communication, January 2016)
Created by Brandon Corey

	A	B	C	D	E
2	Age Group:	1 2 3	Neighborhood:	Blue Orange Green Purple Yellow	
3	Session #:				
4	Children Present:		Comments/Changes:		
5	1.				
6	2.				
7	3.				
8	4.				
9	5.				
10	6.				
11	7.				
12	8.				
13	Extra Adults Present:				
14					
15	Intervention & Target Behaviors		Group State		Details of intervention, responses, or modifications
16	Rules Song		Regulation		
17	o Scaffolds start of session		Low		
18	o Prompts children with group rules		Moderate		
19	o MT leads actions to reinforce rule concepts		High		
20			Engagement		
21			Low		
22	Completed as prescribed		Moderate		
23	Modified in session		High		
24					
25	Hello Song		Regulation		
26	o Low to high energy level, based on group state		Low		
27	o Prompt children to wave hello or give high fives		Moderate		
28	o Incorporate dancing/movement when older/more mobile		High		
29			Engagement		
30	o Assessing for energy level and mood, modify song based to match		Low		
31			Moderate		
32			High		
33	Completed as prescribed				
34	Modified in session				
35					

Current TMAC Field Note Sample (B. Corey, personal communication, December 2016)
Adapted by Brandon Corey

Key Components of and Connections Between the Theoretical Foundations of TMAC

<u>Systems Theory</u>	<u>Humanism</u>	<u>Attachment & Attunement through self-regulation and co-regulation</u>	<u>Theraplay® Dimensions</u>
Child as the center; microsystem context of home, ICCDC, and classroom	Child as a whole person	Self-regulation	Structure Nurture Engage Challenge All dimensions are needed in interactions with parents and caregivers and teachers to support child development.
Music therapy is a part of the child's microsystem	Music as a collaborative process	Co-regulation through music. Group sessions allow the child to practice skills and process emotions within a socio-emotional intervention.	Structure Nurture Engage Challenge All dimensions can easily be provided through music co-regulation opportunities.
Mesosystem-context of interaction of child's microsystems and their relationships with parents & caregivers	Relationship and process	Adult relationships attuned to child's needs; short-term and long-term; responsive in the moment	Structure Nurture Engage Challenge All dimensions are needed in interactions with parents and caregivers and teachers to support child development.

Key Components of and Connections Between the Theoretical Foundations of TMAC

<u>Systems Theory</u>	<u>Humanism</u>	<u>Attachment & Attunement through self-regulation and co-regulation</u>	<u>Theraplay® Dimensions</u>
Risk and protective factors within each systems level	Emphasizes how the client interacts with others and the environment	Influence attachment and the ability to co-regulate, and therefore, other developmental areas of self-regulation, language development, and social skills.	Structure Nurture Engage Challenge Dimensions address the needs created by the risk factors and when used can become a protective factor.
Exosystem-parent and their experiences including job, relationships with others, and toxic stress			
Macrosystem-cyclical patterns of poverty and the culture		Influence common behaviors of parenting. Punitive or harsh parenting is less attuned to the child and influences the building of a secure attachment.	This usually involves a lack of nurture and/or engagement.
Chronosystem-U.S. healthcare system			

Key Components of and Connections Between the Theoretical Foundations of TMAC

<u>Systems Theory</u>	<u>Humanism</u>	<u>Attachment & Attunement through self-regulation and co-regulation</u>	<u>Theraplay® Dimensions</u>
All systems connected to one another and relate to each other.	Focus on relationships and child as a whole person within context of all environments.	Overall, the combined systems influence attachment, which therefore influence the other three areas of development (self-regulation, language, and social interaction.) Important to influence the parent or caregiver's system and ability to use attunement to be able to properly address the child's system.	Structure, nurture, engage, and challenge are all connected, frequently being used at the same time to address the child as a whole person within all the systems and needs presented from those systems.